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SMITHSONIAN INSTITUTION

Fiscal Year 1989

Justification of Estimates of Appropriations
To the Office of Management and Budget



ADMINISTRATIVELY CONFIDENTIAL

(Information not to be released until after the President's
Budget is submitted to the Congress in January 1988.)

September 1987

SMITHSONIAN INSTITUTION

FISCAL YEAR 1989

Justification of Estimates of Appropriations

To the Office of Management and Budget

SMITHSONIAN INSTITUTION

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National Museum Act
National Museum of African Art
National Museum of American Art
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Museum Support Center
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Office of Special Events
Office of Supply Services
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SMITHSONIAN INSTITUTION

FISCAL YEAR 1989 ESTIMATES OF APPROPRIATIONS

TABLE OF CONTENTS

	<u>PAGE</u>
ORGANIZATION OF THE SMITHSONIAN INSTITUTION	
INTRODUCTION.....	1
FY 1989 BUDGET FORMULATION.....	2
FY 1989 BUDGET HIGHLIGHTS.....	8
NONAPPROPRIATED SOURCES OF FUNDING.....	17
SALARIES AND EXPENSES	
Uncontrollable Increases.....	21
<u>Research</u>	
Office of the Assistant Secretary.....	31
Smithsonian Astrophysical Observatory.....	34
Smithsonian Tropical Research Institute.....	44
Smithsonian Environmental Research Center.....	52
National Zoological Park.....	55
Smithsonian Institution Archives.....	64
Smithsonian Institution Libraries.....	67
Major Scientific Instrumentation.....	74
<u>Museums</u>	
Office of the Assistant Secretary.....	81
National Museum of Natural History/Museum of Man.....	85
National Air and Space Museum.....	97
National Museum of American History.....	109
National Museum of American Art.....	118
National Portrait Gallery.....	126
Hirshhorn Museum and Sculpture Garden.....	135
Center for Asian Art.....	139
Archives of American Art.....	147
Cooper-Hewitt Museum.....	151
National Museum of African Art.....	159
Anacostia Museum.....	167
Conservation Analytical Laboratory.....	173
Office of Exhibits Central.....	177
Smithsonian Institution Traveling Exhibition Service.....	179

Public Service

Office of the Assistant Secretary.....	183
Smithsonian Institution Press.....	188

<u>Directorate of International Activities</u>	191
------------------------------------------------------	-----

Special Programs

American Studies and Folklife Programs.....	195
International Environmental Science Program.....	200
Academic and Educational Programs.....	205
Museum Support Center.....	216

<u>Administration</u>	222
-----------------------------	-----

Facilities Services

Office of Design and Construction.....	236
Office of Protection Services.....	238
Office of Plant Services.....	243

MUSEUM PROGRAMS AND RELATED RESEARCH

(SPECIAL FOREIGN CURRENCY PROGRAM).....	249
-----------------------------------------	-----

FACILITIES PLANNING, RENOVATION, RESTORATION, AND CONSTRUCTION

Construction

--Smithsonian Tropical Research Institute.....	251
--General Post Office Building.....	252
--Construction Planning.....	254

Construction and Improvements, National Zoological Park.....	256
--------------------------------------------------------------	-----

Restoration and Renovation of Buildings.....	258
--Major Capital Renewal.....	260
--Repairs, Restoration and Code Compliance.....	263
--Alterations and Modifications.....	266
--Administrative Costs.....	271

SMITHSONIAN INSTITUTION
FY 1989 BUDGET REQUEST
(\$000's)

<u>APPROPRIATION</u> <u>ACCOUNT</u>	FY 1988 <u>CONGRESSIONAL</u> <u>REQUEST</u>	FY 1989 <u>REQUEST</u>
Salaries and Expenses	\$ 204,862	\$ 218,262
Instrumentation		1,405
Restoration and Renovation	14,254	40,000
Construction	4,470	7,200
Zoo Construction	<u>5,150</u>	<u>5,600</u>
 TOTAL	 \$ 228,736	 \$ 272,467

INTRODUCTION

Centered on the Mall in Washington, D.C., the Smithsonian Institution operates major facilities and activities throughout the country and overseas. It is one of the world's leading research centers and encompasses the world's largest museum complex, attracting millions of visitors annually to its museums, galleries and zoological park. Many others also view Smithsonian traveling exhibitions, which appear across the United States and abroad, and the annual Folklife Festival. As custodian of the National Collections, the Smithsonian possesses more than 100 million art objects, natural history specimens and artifacts. These collections are displayed for the enjoyment and education of visitors and are available for research by the staff of the Institution and by hundreds of visiting students, scientists and historians each year. Other significant study efforts draw their data and results directly from terrestrial, marine and astrophysical observations at various Smithsonian installations.

The Smithsonian complex presently consists of 13 exhibition buildings on and near the Mall in Washington, D.C. and New York City in the fields of science, history, technology and art; a zoological park in Washington, D.C. and an animal conservation and research center near Front Royal, Virginia; the Anacostia Museum, which performs research and exhibit activities in a low income area of the city in cooperation with the community; a preservation, storage and air and spacecraft display facility at Suitland, Maryland; two natural preserves, in Panama and on the Chesapeake Bay; an oceanographic research facility at Link Port, Florida; astrophysical stations in Massachusetts and Arizona; and supporting administrative, laboratory and storage areas.

FY 1989 BUDGET FORMULATION

The Smithsonian Institution's FY 1989 budget request to the Office of Management and Budget were developed following new internal budget formulation procedures. These new procedures were aimed at integrating and strengthening internal planning and budgeting processes and ultimately increasing the efficiency and effectiveness of management decisions. In large measure, the new processes are based upon a model followed by many public institutions of higher education, whose education, research and public service programs, governance and organization structure, and sources of funding are similar to those of the Smithsonian. The following paragraphs highlight the principal features of the process followed to set the Institution's FY 1989 planning and budget priorities.

First, in an effort to establish long-term programmatic goals in advance of budget formulation, bureau and office directors were asked to assemble and submit to members of the Secretary's Management Committee their plans and priorities for the next five years. These plans were submitted in early February, and during February and March each Management Committee member held extensive discussions with each bureau and office director to explore fully the issues raised. Based upon these discussions, areas of common interest and opportunities for collaborative efforts among the bureaus were identified on a preliminary basis, along with the potential research and administrative support requirements to accompany those new or expanded programs under contemplation. The identification and examination of the pan-Institutional consequences of individual bureau plans early in the planning process later contributed to improved coordination among bureaus as more refined program and budget plans were developed. After all of these discussions were held, the plans and priorities originally submitted by the bureaus and offices were either endorsed in concept, or indications were given that modifications were in order.

In a related and simultaneous effort, the Secretary and the Management Committee endeavored to amplify the Institution's basic mandate "to increase and diffuse knowledge". The intent was to develop an up-to-date, more explicit statement of purpose for the Institution and a set of related long-term goals. Much effort was directed at accurately articulating the essence of the Institution, its management philosophy, its aspirations for program quality and its heightened awareness of the need to reach a wider audience in more resourceful and sensitive ways. An integral part of this effort was also directed at determining an appropriate set of programmatic "areas of emphasis" representing the Institution's most important opportunities and requirements in the years ahead.

The "Statement of Purpose" and related long-term goals for the Institution appear in Exhibit 1, and the Secretary's "Areas of Emphasis" appear in Exhibit 2. These documents were endorsed by the Board of Regents at its meeting in May of this year and distributed to the bureaus and offices as the Secretary's formal guidance for budget formulation and further planning for the next five years. Bureaus were instructed to prepare budget plans that were responsive to and consistent with this guidance. After the bureaus submitted their budget plans for the next five years, these documents subsequently guided the establishment of the budget priorities embodied in the Institution's FY 1989 federal budget request, in its FY 1988 and FY 1989 budgets for nonappropriated funds and in its Five-Year Prospectus.

EXHIBIT 1

SMITHSONIAN INSTITUTION

STATEMENT OF PURPOSE

The Smithsonian Institution was created by Act of Congress in 1846 to carry out the terms of the will of James Smithson of England, who bequeathed his entire estate in 1826 to the United States of America "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

Joseph Henry, the first Secretary, in his efforts to give purpose and direction to activities of the fledgling Institution, commented on Smithson's will in his annual report for 1864:

"He evidently did not intend by these precise terms to found a library or a mere museum for the diffusion of popular information to a limited community, but a cosmopolitan establishment, to increase the sum of human knowledge and to diffuse this to every part of the civilized world. No other interpretation of the will is either in accordance with the terms employed or with the character and habits of the founder. The increase of human knowledge, by which we must understand additions to its sum, would be of little value without its diffusion, and to limit the latter to one city, or even to one country, would be an invidious restriction of the term men."

Over the course of its one hundred and forty-one year history, and under the direction of succeeding Secretaries, the Institution has evolved into an eminent research center and the world's largest museum complex. Its activities span the globe and are devoted to research, museology, and public education in the arts, sciences, and history in the service of all mankind.

The Smithsonian is a unique establishment which is both publicly supported and privately endowed, and whose governance is vested in an independent Board of Regents composed of federal officials, members of Congress, and private citizens. Donations from both the public and private sector increase its collections and continuing additions to its trust funds expand and nourish the Institution's usefulness. Appropriations by Congress provide steadily increasing federal support for the Smithsonian's far-reaching services to the public. Annually hundreds of thousands of service hours are provided to the Institution by dedicated volunteers.

EXHIBIT 1

SMITHSONIAN INSTITUTION

STATEMENT OF PURPOSE (Continued)

The research, management, care, exhibition, and security of its collections, the maintenance of its buildings, facilities, and natural areas and a program of selective acquisition for the collections are basic institutional commitments. The Institution's holdings are a trust responsibility and serve as important assets for future generations.

In addition to collections and non-collections related original research, museum curation, and collections management, the Smithsonian conducts a wide range of other programs in carrying out its broad goal of increasing and diffusing knowledge. It participates in joint ventures with other organizations in the United States and on every continent to study and understand subjects of world importance. Fundamental data are assembled for use by planners and research workers in other organizations, both government and private, national and international in scope. Historical and art studies, which enhance knowledge of man's cultural and technological growth, are also major endeavors. The results of the Institution's varied activities are disseminated to a wide audience through exhibitions, publications, and other public media programs.

Most important to fulfilling the basic purpose of its founding benefactor, the Institution places the highest priority on achieving quality in the conduct of its activities while making the most effective use of available resources.

GOALS

The Institution seeks to achieve its basic mission to increase and diffuse knowledge in the following ways:

- By providing the highest quality of research, curatorial, and professional leadership and expertise through emphasis on excellence in staff appointments and promotions, and through maintaining and improving technical assistance, fellowship programs, equipment, and facilities which support collections related and other original research.
- By promoting joint research, museum and education programs with other domestic and foreign academic and museum enterprises through a sharing of knowledge, expertise, exhibitions, collections, facilities, and other resources.
- By providing stimulating educational and museum experiences for all visitors, and by promoting outreach activities at many levels, especially those that will increase participation by minorities, handicapped persons, senior citizens, and other specialized groups.

EXHIBIT 1

SMITHSONIAN INSTITUTION

STATEMENT OF PURPOSE (Continued)

- For the sake of future generations of scholars and visitors, by careful attention to the acquisition, care, and preservation of collections and institutional facilities that house them, especially as related to protection, inventory, storage, building maintenance, equipping activities, and renovation of exhibit and other public areas.
- By producing exhibitions using the Institution's and other collections and contemporary techniques to communicate to the Institution's audiences information about historical and cultural development, recent discoveries, new technologies, and new results of scholarship in science, history, and art.
- By producing quality magazines, books, periodicals, catalogues, journals, television and radio programs, and other educational products for the research and museum communities, and the general public.
- By providing a more complete understanding of programs and activities to the general public, foreign and domestic research and museum communities, and governmental organizations through the latest media and technical advances.
- By maintaining management, administrative, and support services to meet program needs, by providing internal financial systems and controls, and by periodic assessments and orderly planning for new and renovated facilities for purposes of accomplishing research, collections, and public related programs.

EXHIBIT 2

SMITHSONIAN INSTITUTION

AREAS OF EMPHASIS

Management Philosophy. Improve communications between central and bureau management; develop cooperative operations among bureaus with common interests; and critically evaluate all ongoing programs and support activities for purposes of discontinuing those that have outlived their usefulness, improving the quality of program products and delivery of services, and redirecting resources to more important efforts.

Research and Research Support: Collection and Non-Collection Based.

- Strengthen emphasis on excellence in staff promotions and appointments; progress with equal employment and affirmative action objectives.
- Strengthen joint programs and ties with other academic and museum enterprises, domestic and foreign, in areas of common interest.
- Increase bureau flexibility and responsibility for development of and response to new museum and research initiatives in art, history, and science areas.
- Provide for orderly forward planning and commitments for research instrumentation and facility development (STRI plan, SAO Whipple base camp, MMT conversion, submillimeter telescope, Zoological Research facility at Rock Creek).
- Strengthen and balance biological and biodiversity research and associated technical support (especially among such areas as taxonomy, systematics, molecular biology, specie propagation, and other environmental studies).
- Enhance fellowship and internship programs.

Public Services. Strengthen visitor experiences and services based on researched demographics and needs; widen educational and museum outreach, specifically through exhibitions, program and membership initiatives directed toward minority audiences and development of new teaching materials and aids.

EXHIBIT 2

SMITHSONIAN INSTITUTION

AREAS OF EMPHASIS (Continued)

Facilities.

- Pursue correcting the backlog of deferred building maintenance, strengthening preventive maintenance programs, accelerating renovation of exhibition space, and continuing with initial equipping and outfitting of the Museum Support Center.

- Examine and pursue orderly scheduling and development of major renovations and new construction projects; develop an in-house facilities planning capability.

Collections Management. Continue to strengthen collections management and to identify associated requirements (storage, inventory, systems, conservation).

Administration. For the successful realization of institutional program goals, pursue correction of operating and funding deficiencies in protection and plant services, safety and environmental programs and accounting, personnel, and procurement activities.

International and Associated Programs. Promote increased public awareness and understanding of other cultures; foster international scientific cooperation and exchange; continue with present scope and projected rate of growth of the Columbus Quincentenary program, but incorporating new and worthwhile projects, if necessary, and if they provide long-term and lasting foundations in strengthening international relations, particularly with Latin America.

General Development. Continue to examine and consider various realistic ways to increase basic trust resources of the Institution, including product development, a general capital campaign, cultivation of donors, international markets, and alternative investments.

FY 1989 BUDGET HIGHLIGHTS

The Smithsonian Institution's FY 1989 budget request for all accounts totals \$272.5 million, or \$38.7 million more than the planning target issued by the Office of Management and Budget for FY 1989. In brief, the majority of the request for increased funds represents the Institution's emphasis in FY 1989 on elevating the appropriation for the Restoration and Renovation account to the level necessary to begin to eliminate the substantial backlog of deferred maintenance in its various facilities. Continued funding for this account at a "current services" level would force the Institution to fall further behind with the essential maintenance and repair work required to assure the continued operation of building equipment and systems, to provide long-term preservation of buildings or to bring buildings in compliance with life and health codes and standards. The remainder of the request for increased funds represents the funding required to support the Institution's various "Areas of Emphasis" for achieving its long-term programmatic goals. Following are highlights of the FY 1989 budget request for each of the Institution's four appropriation accounts.

Salaries and Expenses

The Salaries and Expenses (S & E) request is \$219.7 million and 4,269 work-years. This represents an increase of \$14.8 million and 159 workyears over the FY 1988 request to Congress and \$5.0 million and 294 workyears over the FY 1989 OMB planning target.

Included in the S & E request are additional funds totaling \$5.9 million to cover basic "uncontrollable" cost increases for necessary pay, the new Federal Employees Retirement System, rent, utilities, postage, communications and inflation. In addition, the S & E request includes as an uncontrollable item a "catch up" request for 135 workyears. This represents the cumulative number of workyears that have been authorized by Congress without a concomitant increase in the OMB workyear ceiling.

The remainder of the S & E request would allow \$8.9 million of program growth, with \$3.9 million of this growth within the OMB target and the remaining \$5.0 million over target. All requested growth is built upon the FY 1988 budget request pending before Congress. This \$8.9 million is distributed among the Secretary's various "Areas of Emphasis" shown in Exhibit 2 as follows:

<u>Area of Emphasis</u>	<u>Amount</u>
Research and Research Support	\$3,321,000
Public Services	726,000
Collections Management	1,598,000
Administration	2,958,000
International and Associated Programs	<u>288,000</u>
TOTAL	\$8,891,000

The following paragraphs provide a profile of some of the major initiatives in the requested S & E budget for these various functional areas.

Research and Research Support--A major portion of the request for additional funding support for research is to enable the Astrophysical Observatory to continue efforts directed at the eventual construction of telescopes for use at submillimeter wavelengths and to continue the conversion of the Multiple Mirror Telescope to a single mirror telescope. It is particularly significant that the FY 1989 request also reflects an indispensable change in the way the Smithsonian is now able to plan for the acquisition of such major scientific instrumentation through the S & E account.

The Institution has in the past purchased most needed research equipment as an operating expenditure through the S&E account. However, it became increasingly difficult to conduct orderly and cost-effective planning for the acquisition of major pieces of instrumentation that are more analogous to capital costs under the constraints of a one-year appropriation. Instruments such as telescopes require careful research and development (R & D) over an extended period by concentrated teams of in-house scientists and technicians for such critical sub-elements as optics, receivers and structural forms. In addition, the fabrication of these sub-elements, or necessary modifications to them, must be done largely in-house, or with specialized contractors, as opposed to being bought off the shelf.

The budget request for SAO's telescope initiatives therefore reflects the establishment, within S&E, of a sub-account for "Major Scientific Instrumentation" that will accommodate no-year appropriations for these R & D costs. This change in our account structure was approved earlier this year by OMB. The no-year provision will allow the flexibility that is so critical to the development of these telescopes and other leading-edge scientific tools. The development of such instruments involves, almost by definition, the unknown, since researchers are pushing back the frontiers of science and technology. As a result, certain sub-elements of a particular instrument may develop at different rates, for which such flexibility will be at least as helpful.

The Smithsonian's initiatives for the further development of a submillimeter wavelength telescope array and for the conversion of the Multiple Mirror Telescope represent cutting edge scientific projects. They involve the fabrication of major new instrumentation that will take a number of years to plan, design and complete. The development of the submillimeter array could not be completed before the mid-1990's and will require total funding currently estimated at \$30 million. Similarly, the conversion of the MMT, which might be completed as early as 1992, will require estimated funding of \$10 million during the intervening years.

Also included in the request for "Research and Research Support" is additional funding for the National Air and Space Museum to intensify efforts relating to historical research in aeronautics. The additional staff requested will be instrumental in improving productivity in this field of research in the publication of books by academic presses and articles in peer review journals.

In addition, funds are requested for the National Museum of Natural History to expand its research program in biological diversity to proceed with the inventorying of species. The requested increase will enable additional field work and collaboration with other institutions. Additional funding is also requested to enable the Natural History Museum to establish a permanent sustainable capability for research in the rapidly developing field of molecular systematics, building upon the Museum's broad expertise in systematic biology encompassing both historical and ecological perspectives. Other requested research funds will allow the

National Zoological Park to complete its development of the molecular systematics and evolution program through the establishment of a genetics laboratory.

Public Services--Other components of the FY 1989 budget request are directed at providing better programs and services to the public. Additional funds are requested for the renovation and reinstallation of exhibits at the National Museum of American History and at the National Museum of Natural History. Funds for the American History Museum will enable the reinstallation of major permanent exhibits throughout its three floors of exhibition space. Additional funds for the Natural History Museum will enable it to embark on a long term renovation plan for its 30 permanent halls.

In addition, funds are requested to add staff members in the Native American programs at the American History and Natural History Museums and for internships for Native Americans offered by the Office of Museum Programs. Through cooperative programs offered by these bureaus, improved access to Native American collections will be made available, new links will be forged with Indian communities and training appropriate to Native American interests and needs will be provided.

Finally, building on the initial launch of the National Science Resource Center last year, additional funding is requested for education laboratory center staff and for preparation of teacher resource materials. The NSRC is serving the Nation's schools by promoting collaborative activities with science museums, professional and scientific organizations, and scientists from universities and industry to develop new learning materials to strengthen education in mathematics and science.

Collections Management--Collections management is an issue to which the Institution is seriously committed. Additional funding is requested for the Museum of Natural History for support staff to process backlogs and new incoming material, maintain the inventory, and evaluate and cull collections. In addition, funds are requested to allow the Museum of American History to convert data to the Institution's new IBM/INQUIRE system, which offers an online data base useful for management of collections for research, support to exhibit planning and object interpretation. These two museums have problems of the largest magnitude. Other requested funds will support additional staff--conservators, registrars and computer specialists--as well as storage space and equipment. A significant amount of the request is for additional collections storage equipment for the expanded and renovated areas at the Freer Gallery of Art. In some cases, the requested funding will provide professional assistance in collections management for the first time (i.e., at the Archives of American Art and the Anacostia Museum).

Administration--Among the most urgent of administrative needs are additional funds for the Office of Environmental Management and Safety to continue to improve environmental and safety programs. Equally important is the need for additional staff to maintain, operate and protect the General Post Office Building. Additional security staff are also required to accommodate requirements based upon final design of gallery space in the Quadrangle. These administrative requirements are in a sense uncontrollable, since the Institution has an obligation to provide for the safety of visitors, employees and the National Collections. Other funds are requested to fully implement Phases 2 through 4 of the Institution's new payroll/personnel system, which is being established through the U. S. Department of Agriculture's Finance Center in New Orleans with nonappropriated funds. Additional funding is also requested to allow the development of subsystems for the

Institution's planned new financial information system, whose planning and acquisition costs have thus far been supported by nonappropriated funds.

International and Associated Programs--To continue to plan and prepare exhibitions and events to commemorate the Bicentennial of the Constitution and the Columbus Quincentenary, additional funds are requested for several museums and offices to continue efforts begun in FY 1987 and for new starts in FY 1989. Among these are the Museum of Natural History, the Air and Space Museum, Museum of American Art, Cooper-Hewitt Museum, Traveling Exhibition Service, Office of Elementary Secondary Education, and the Office of Folklife Programs.

Restoration and Renovation

The Smithsonian Institution is requesting a total of \$40 million in its Restoration and Renovation (R&R) account for four subaccounts. First, \$7,663,000 is requested for the initiation of a Major Capital Renewal program to replace major building systems that are approaching the end of their useful lives at several of the Institution's facilities. In addition, \$25,187,000 is requested for a second subaccount for Repair, Restoration and Code Compliance projects. Amounts requested in these two subaccounts will allow the Smithsonian to begin to reduce the backlog of deferred maintenance projects that have accumulated in recent years as the result of inadequate levels of funding. Based upon inspections of the Institution's various facilities thus far completed, current estimates of the cost of required maintenance projects total approximately \$216 million. Funds totalling \$5,185,000 are also requested in a third subaccount for Alterations and Modifications to facilities. Included in this category are those projects which are driven by changing programmatic needs rather than repair or preservation considerations. Finally, the R&R request includes \$1,965,000 and 38 workyears in a fourth subaccount representing the concomitant administrative requirement to effectively manage an R&R program at the expanded level contemplated.

Construction

In the Construction account, a total of \$7,200,000 is requested to enhance the Institution's planning capability for future new facility or space requirements (\$1,300,000), to design and construct laboratory and research facilities for the Tropical Research Institute (\$2,900,000), and to design the renovations necessary to make the Old General Post Office Building usable as program space for the National Museum of American Art, the National Portrait Gallery and the Archives of American Art (\$3,000,000).

Construction, National Zoological Park

The request for the Construction and Improvements, National Zoological Park account is \$5,600,000. This amount includes \$1,650,000 for the highest priority repair and renovation projects at Rock Creek Park and \$750,000 for the highest priority projects at Front Royal. The remaining \$3,200,000 requested is to begin the modifications necessary to convert the Polar Bear Exhibit to an Amazonia Exhibit by enclosing the facility with the required mechanical systems to support a greenhouse type structure.

MANAGEMENT IMPROVEMENT ACTIVITIES

The President's budget for FY 1988 included as a special separate document a report on his management improvement program. Although the Smithsonian Institution is not an executive agency and therefore not a formal participant in the President's program, the following comparison of the President's and the Smithsonian's management improvement initiatives exemplifies the Institution's commitment to increasing the efficiency and effectiveness of its operations.

Credit Management

The President proposes to achieve a major reduction in amounts owed the federal government by using proven private sector debt collection techniques, offsetting delinquent debt against income tax refunds and federal employee salaries and referring cases to the Justice Department for litigation.

Debt collection from outside persons or businesses has not been a significant problem at the Institution. In the spirit of the President's goal, actions have been put in place to reduce the level of outstanding travel advances to SI employees which constitute interest-free loans to them. Over the past two years the level of such advances has been reduced from \$597,350 (1722 items; 12 percent under 30 days) to \$368,615 (688 items; 40 percent under 30 days).

Financial Management

Stressed in the President's report are consolidation of agency accounting systems, adoption of other agency's systems, or buying off-the-shelf software.

A major Smithsonian effort in this area has been spearheaded by the Office of Financial Management and Planning to define and design a financial information system which will meet the various needs of a decentralized organization with centralized support operations, a variety of funding sources and a high volume procurement/payment process and also allow for better access to and communication of financial information throughout the Institution. Several federal and commercial systems are being reviewed with the goal of selecting a system soon.

A new automated budget process, which is also integrated with the planning process, has been initiated by the Office of Programming and Budget. This has led to increased efficiency in assembling all of the organizational components of the budget submissions to OMB and the Congress, increased access to greater amounts of program and financial information for more effective decision making and a strengthened relationship between the short and long term planning processes. Eventually, this automated budget and planning system can be integrated with the aforementioned financial information system, once it is implemented.

The crossover from the Honeywell mainframe computer to the IBM 4381 will provide access to a wider range of off-the-shelf software packages rather than having to design customized software, thus saving programming resources.

The Smithsonian Institution's internal controls program, contained in Office Memorandum 823, embodies the principles outlined in OMB Circular A-123, with an Internal Controls Steering committee established in 1983 to oversee a formal internal controls and review effort carried out on a cyclical basis. The monitoring and reporting process is carried out for the Committee by the Management Analysis Office, assisted by the Office of Audits and Investigations. Computer security and timeliness of payments have been identified as the two priority areas requiring improvement.

Productivity Improvement

The President's major initiative in this area is to boost productivity by 20 percent in selected programs between 1986 and 1992, an average of approximately 3 percent each year. This effort is aimed primarily at improving delivery of services to the public.

The transfer of the personnel/payroll system to the National Finance Center in New Orleans currently in the implementation phase should result in the Institution's ability to maintain better quality data and faster processing of personnel actions. The move will automate many functions which are currently done manually, which should free staff to do other tasks leading to greater efficiency.

Another initiative undertaken by the Office of Personnel Administration is the 24-hour recorded personnel information hotline for handling routine calls. This system gives answers and information for the most current personnel problems, e.g., the new Federal Employees Retirement Plan, the Thrift Savings Plan, snow closings, etc. The use of recorded information frees staff from answering many routine calls and provides standard information on key issues. Office automation and bar coding of the official Personnel Files have lessened the typing load and provided better access control to files as well as the ability to track file room activity.

The new Staff Bulletin, prepared by the Management Analysis Office, permits the consolidation of various types of information that is of interest to the general staff, thus saving paper and staff time on a number of separate announcements. It also provides for regular issuance of such information and strengthened communication throughout the Institution.

Procurement Management

The administration's procurement reform agenda includes the enactment of the Competition in Contracting Act (CICA) to address the need for increased competition in government contracting and the issuance of the Federal Acquisition Regulation (FAR) which simplified the regulatory process. The intended results are improvements in the procurement process -- including the acquisition of more commercial products; shortening the lines of procurement authority and responsibility; and improving the overall quality of the federal procurement workforce.

The Smithsonian has complied with the CICA which has reduced the number of sole source contracts awarded by the Institution. Rapid and comprehensive adoption of the FAR, through extensive outside and in-house training and revision of clause manuals and all contractual documents, has allowed implementation to take place with a minimum of disruption and post-award problems.

In addition, a Procurement Executive (Director of the Office of Procurement and Property Management) has been appointed who ensures implementation of the policy directives of the Office of Federal Procurement Policy (OFPP) and coordinates the planning and scheduling of all high dollar procurements.

A major initiative from the Procurement and Accounting Offices was a simplified purchasing system for small purchases (under \$1,000) that provides more flexibility and responsiveness for the purchasing unit in the acquisition of normally commercially available products and services. This new system also has streamlined the internal requisitioning process by eliminating extraneous small purchases from the centralized procurement pipeline, improving cash management, and expediting the payment process. Complete documentation and audit trails are maintained.

The Procurement Office is scheduled to begin implementation of its plan to automate the bulk of the acquisition management process. This will encompass development of a management information system to track the volume, flow and status of requisitions as they develop into contracts. The result will be better on-line control of budget expenditures and establishment of an instant and continuous record of resultant additions, deletions and changes to the property management system records.

Other reforms include issuing formal and documented delegations of authority, publishing updated handbooks which delineate the proper flow of documentation, and carefully monitoring staffing and career development to ensure that contracts staff have the most current training and techniques available in the field.

Privatization

In his management message, the President points out that the federal government often provides services that are available from the private sector at less cost and with better quality. He proposes to eliminate such inefficient federal practices wherever possible.

As outlined in OMB Circular A-76, the requirement for agencies to rely upon commercial sources to supply needed products and services is a program whose intent and general thrust is observed by the Institution. Each year the Management Analysis Office does two studies of Smithsonian activities to assess the potential for continued internal operation or provision by contract of services which seem to lend themselves to a contract arrangement. So far these studies have covered grounds maintenance and elevator and escalator maintenance. Building custodial services and Office of Exhibits Central activities are under review this year.

The Office of Personnel Administration has contracted out all processing of Unemployment Compensation claims. This annual contract of \$11,000 has saved the Institution the cost of four staff members who would be necessary to handle the same services.

Exhibit 3 on the following pages summarizes the Smithsonian's various management improvement activities.

EXHIBIT 3

SMITHSONIAN INSTITUTION
MAJOR MANAGEMENT IMPROVEMENT INITIATIVES

AREA OF IMPROVEMENT	UNIT	DESIRED RESULT
<u>Credit Management</u>		
Reduction of outstanding travel advances	OAFS	Better management of cash
<u>Financial Management</u>		
Financial information system	OFM&P	Upgrade accounting and budgeting systems and provide better access to financial information.
Automated budget process	OPB	Improved efficiency and timeliness
Change in computer mainframe	OIRM	Savings in programming resources
Internal Controls Steering Committee	MAO	Allows oversight of progress in weak areas where recommended changes have been made
<u>Productivity Improvement</u>		
New payroll/personnel system	OPersA	Better quality data and faster processing
Recorded personnel information	OPersA	Frees staff from answering routine calls; assures standard answers
Bar coding of official personnel files	OPersA	Gives ability to track activity in file room and better access control
<u>Procurement Improvement</u>		
Appointment of Procurement Executive	OPPM	Better planning and scheduling of high dollar procurements
Simplified small purchasing system	OPPM	More flexibility and responsiveness for purchasing unit
Automation of acquisition management process	OPPM	Better flow of information; on-line control of budget expenditures; improved property management system records

EXHIBIT 3

SMITHSONIAN INSTITUTION MAJOR MANAGEMENT IMPROVEMENT INITIATIVES

AREA OF IMPROVEMENT	UNIT	DESIRED RESULT
<u>Privatization</u>		
Contract unemployment insurance processing	OPersA	Substantial savings and less need for staff
Contracting out studies	MAO	Cost/benefit analyses of various services; will allow for savings where possible

NONAPPROPRIATED SOURCES OF FUNDING

In addition to the support provided by Federal appropriations, the Institution also receives nonappropriated funds to expand and enrich its programs. The nonappropriated fund activities (Trust funds) are presented along with the Federal budget request to provide an overview of all uses of funds for each Smithsonian bureau. It must be emphasized that the estimates for Trust funds are subject to change due to the unpredictability of donations, grants and contracts to the Institution, fluctuations in visitor attendance and uncertain economic factors, which affect restaurant, mail order and shop revenues, Associates' memberships and other auxiliary activities. The Institution's gross operating revenue, less the expenses of the auxiliary activities, represents the net operating revenue available for programmatic and other worthwhile purposes.

The FY 1988 Trust budget comprises approximately 26 percent of net operating revenues. Included in the above are grants and contracts received from government agencies. These are expected to total nearly \$18 million in FY 1988. Gross revenues of Trust funds, excluding government grants and contracts, are expected to continue to grow as in previous years and reach \$200 million in FY 1988. Net income, however, is projected in the \$54 million to \$56 million range (of which \$19 million is projected for restricted purposes).

The Trust funds are composed of unrestricted funds, restricted funds and government grants and contracts and are applied in the following manner:

Unrestricted Funds

General - General unrestricted funds are generated from: short-term investment income; unrestricted endowment income; net proceeds from museum shops and food service concessions; sales of Smithsonian books, records and other products based on designs and objects in the collections; and the Resident Associate and National Associate Programs (including Smithsonian magazine and the new Air and Space magazine). Central management and administrative service units of the Institution, such as legal counsel, accounting, personnel, procurement and budget, receive Trust allotments from the General fund. These administrative costs are primarily funded from overhead recovery on grants and contracts received by the Smithsonian and from internal administrative fees charged to other Trust funded activities. General funds are also provided to various activities, such as the Visitor Information and Associates' Reception Center, the Cooper-Hewitt Museum, Smithsonian Tropical Research Institute, Office of Telecommunications and the Office of Folklife Programs, along with a variety of program allotments for important Institutional and bureau needs as approved by the Board of Regents.

Special Purpose - These funds are generated by income-producing activities operated by the various bureaus and offices, the largest of which are the Theater and Spacearium operations of the National Air and Space Museum. Special Purpose funds also include: miscellaneous bureau revenues from the sale of posters, exhibit brochures and publications; tuition reimbursement from universities; the museums' share of sales in the restaurant and museum shops; membership and admission fees; exhibit rental; and investment income from current fund balances.

Beginning in FY 1979, the Board of Regents approved transferring General funds to Special Purpose funds for certain programs previously financed with appropriated funds. These include the Institution's various fellowship programs (FY 1988 allotment of \$2.7 million) and the appropriate Trust fund share of rental costs of administrative units in L'Enfant Plaza, funded in part from rental payments by

auxiliary activities occupying space on the Mall. Special Purpose funds are also created by transfers from the General fund for awards from the Institution's Collections Acquisition, Scholarly Studies and Educational Outreach Program. Of the \$4.7 million approved for FY 1988, an amount of \$1.7 million is available for purchase of outstanding objects of importance to the collections. In FY 1986, the Sackler Gallery purchased the Vever collection of magnificent Islamic and Persian Art consisting of 39 volumes, 291 miniatures, 98 calligraphies and illuminations, 29 book bindings, 4 textiles and examples of almost all of the classical Persian texts known. The Hirshhorn Museum and Sculpture Garden acquired the sculpture, "Soft Engine for Air Flow with Fan Transmission-Scale 5 (Model)", by Claes Oldenburg; a bronze sculpture, Cronos, by Isamu Noguchi, one of this century's most significant sculptors; and an oil on canvas painting, Berkeley #22, by Richard Diebenkorn. In addition, the National Museum of American History acquired three clockwork objects: an orrery, by Aaron Willard, Jr., which is a mechanical model of the solar system, made about 1825, and the earliest signed American orrery and one of the earliest signed American scientific instruments ever to come on the market; a tall case clock, signed by Peter Stretch and dated between 1702 and 1715, which is among the earliest clocks made in this country; and a tall case clock signed by David Rittenhouse, the leading American clockmaker, instrument maker and astronomer of the 18th century.

An additional amount of \$2.4 million is designated by the Program for innovative scholarly research projects which by definition do not lend themselves to or cannot be accommodated in a timely manner within the Federal budget process. These include multi-disciplinary research projects conducted within and between bureaus and projects that may have also been awarded external funds, requiring additional matching Trust support. For example, at the National Museum of Natural History extensive efforts have been made to document the previously unknown arthropods of the tropical forest canopy. Over one million specimens were collected from five different kinds of forest throughout four seasons. These vast collections were sorted and analyzed. Over 3,000 species of beetles were found and the ecology of their associated habitats was carefully studied. Now scientists are using this information to ask important basic questions concerning plant/insect interactions, such as whether or not individual species of tropical forest canopy herbivores are restricted to specific species of trees. Scientists at the National Zoological Park are also continuing their efforts to sustain the biological diversity of our plants through improved understanding of the reproductive physiology of wildlife. Endocrinological studies of six species found at the Zoo, including the Golden Lion Tamarin and Pere David's deer, will provide insight into the basic developmental biology of the species, allow evaluation of mechanisms for preserving genetic diversity, and test the potential for introducing such strategies to other unstudied and critically endangered New World species. At the Smithsonian Astrophysical Observatory research is underway to significantly improve the frequency stability of atomic hydrogen maser clocks. These clocks provide time and frequency signals which contribute to the success of tracking, navigation and data retrieval systems involved in interplanetary travel studies. The use of maser clocks in radioastronomy allows measurements to be made at a scale of accuracy which could be described as equivalent to reading a newspaper in Boston from Los Angeles. Funding has also supported the multi-institutional and interdisciplinary Hopi ceramics project at the Conservation Analytical Laboratory. Compositional, technological, and stylistic investigations of pottery produced in the Southwest between A.D. 1300 and 1600 focus on the nature of Hopi society before the Spanish Entrada. Analytical data derived from such techniques as neutron activation analysis, microprobe analysis, and scanning electron microscopy provide a framework

within which design configurations that are sensitive indicators of social interaction may be isolated.

The remaining \$550,000 of the \$4.7 million available for this Program is allocated to conduct a wide range of educational outreach programs of benefit to the public. For example, to make our traveling exhibits more accessible to the hearing disabled, these funds are being used to develop a generic, participatory "Sound Lab" to make sound visual and tactile. Also, in this area, funding was made available to produce a docent training videotape, "Part of Your General Public is Disabled." Several allocations were made in our ongoing efforts to attract wider audiences. Among them are: an ongoing program in Hispanic American History; present "Quilting: A Docu-drama" designed to explore the conflict of cultural-social values among Euro-Americans, African-Americans, and Native Americans during the period of the American Revolution; a presentation by the Honorable Shirley Chisholm on "Afro-Americans and the Constitution" at the opening of Black History Month; a series of film images of Native Americans in conjunction with the American Sampler series segment on Traditional Dance and Song of the Seneca; and support of the audience development component of the "Field to Factory" exhibition, by the implementation of a strategy to promote visitation and active public participation in documenting the Great Migration, as well as the production of 200 special booklets for the visually and hearing impaired.

In addition the Program supported the following other outreach activities: a program to assess the needs of the Native American Communities to develop a multi-year outreach program at the National Museum of Natural History; a resource kit covering the historical role of the Iroquois in the Constitution of the United States; and, the first of a multi-year series of programs of the diverse community based traditional, cultural expressions of the Washington, D.C. metropolitan area. The Program also sponsored a four-week workshop for science teachers, scientists, science museum educators and science supervisors from throughout the United States, to develop activity-centered science units for grades one through six. Funds for the film, "Bubbles in the Universe," will use the Smithsonian discovery of the bubble structure of the universe as an example to investigate the critical role of debate and controversy in the acceptance of scientific knowledge. Planning funds were also provided for the development of a "University of the Air," a new educational curriculum on the intellectual and cultural foundations of the 20th century.

In FY 1985, the Board of Regents approved an annual Trust fund allocation for the Special Exhibition Fund. The cost of exhibition programs has generally been met with Federal funds which will continue to provide the predominant financing for the Institution's overall exhibition effort, with supplemental donations being provided by individuals, foundations and corporations. Administered similarly to the Collections Acquisition, Scholarly Studies and Educational Outreach Program, the Special Exhibition Fund, with \$3.2 million in FY 1988, will provide funds for exhibitions proposed by Smithsonian bureaus that, regardless of scale, are outstanding in terms of their educational value to the public. Subject to a competitive review and selection process, the request must be for exhibitions of sufficient importance to benefit the viewing public. Special Exhibition awards were made to support ten exhibitions in FY 1986, including two inaugural exhibitions in the new Quadrangle facility. "The Fabric of Life: West African Weaving Traditions" will use 40 examples of west African woven cloths to provide an overview of the history, traditional technology and artistry of the region. "Generations: Birth Rituals and the Roots of Becoming" will open in the International Gallery and will

provide a cross-cultural, multi-disciplinary investigation of art and rituals associated with birth and infancy from ancient times to the present. Among other funded exhibitions are "Tropical Rainforests: A Disappearing Treasure," featuring the diversity of rainforests, threats to their existence and efforts to preserve these areas, and "Crossroads of Continents," an anthropological study of the development of complex cultures in the Bering Sea and north Pacific areas.

Restricted Funds

Restricted Trust funds include gifts, grants and endowments from individuals, foundations, organizations and corporations which specify the use of the donation or bequest. Generally, these funds provide support for a particular exhibit or research project. The Freer fund is the largest restricted endowment of the Institution. It is strictly controlled under the terms of the original gift and bequest for the sole use of the Freer Gallery of Art.

Government Grants and Contracts

Government grants and contracts are provided by various agencies and departments for special projects which can be conducted at the Smithsonian because of its expertise in a particular area of science, history, art or education, and because of its ability to respond quickly to certain kinds of needs.

SALARIES AND EXPENSES

FY 1989 UNCONTROLLABLE INCREASES

Funds are sought to finance costs that are beyond the control of the Institution. These costs result from established practices in regulating wages; higher rental costs, and the effects of inflation and other factors. Consequently, an amount of \$5,914,000 is requested for uncontrollable costs in the following areas:

	<u>FTE</u>	<u>Amount</u>
Salary and Related Costs		
--Workyears	135	
--Within-grade Step Increases		\$1,986,000
--Federal Employees Retirement System		1,441,000
--Workers' Compensation		43,000
--OMB Grade Target Reduction		<u>-186,000</u>
Total Salary and Related Costs		\$3,284,000
Utilities, Postage and Communications		\$ 950,000
Rental Space		\$ 380,000
Inflation	---	<u>\$1,300,000</u>
Grand Total, Uncontrollable Increases	<u>135</u>	<u>\$5,914,000</u>

SALARY AND RELATED COSTS - An amount of \$3,284,000 is required for the projected higher salary and benefits costs in FY 1989 for FY 1988 staff. Costs required for within-grade increases (\$1,986,000) are calculated for each of the bureaus and offices, taking into consideration workyears authorized by the Office of Management and Budget (OMB). Funds also are required in FY 1989 to cover increased costs attributable to the new Federal Employees Retirement System (\$1,441,000) and increased workers' compensation (\$43,000). These requested increases are partially offset by a reduction of \$186,000, which was mandated by OMB for positions in grades 11 through 15.

Workyears - An additional 135 workyears are sought to provide the Institution with a workyear ceiling sufficient to support the total FY 1988 requested full-time equivalent positions pending before Congress. This increase in workyears would allow the Institution to hire the authorized positions as appropriated by Congress. Without the increase, the Institution would be unable to fill positions required to conduct new or expanded programs consistent with Congressional intent without exceeding the ceiling. If the Institution is unable to fill these positions because the ceiling is not lifted, it would be impossible to initiate these new or expanded programs.

Within-grade Step Increases - A sum of \$1,986,000 is sought in FY 1989 for within-grade step increases. For General Schedule employees, these increases are required by Section 5335 of Title 5, United States Code. Wage employees are covered by law and prevailing rates. Increases include the part-year cost of new actions scheduled to occur in the budget year, as well as the cost of annualizing step increases occurring in FY 1988.

Federal Employees Retirement System - The Federal Employees Retirement System Act of 1986 (P.L. 99-335) established a new basic benefit pension plan and a savings plan for Federal Civilian employees. For FY 1989, an amount of \$1,441,000

is required to cover increased costs that will be incurred under the new system. This amount has been computed in accordance with guidance in Office of Management and Budget Bulletin 87-2.

Workers' Compensation - An amount of \$43,000 is required to meet the provisions of Section 8147(b) of Title 5, United States Code as amended on April 21, 1976 by P. L. 94-273. This law provides for payments to be made to employees for injuries and to their families in cases where work accidents result in employees' deaths. These payments are determined and made by the United States Department of Labor's Employment Standards Administration, which subsequently bills agencies for costs incurred for their employees. The Institution continues to pursue its Accident Safety Program administered by the Office of Environmental Management and Safety. This office conducts employee training in safe working environments and supports a staff whose duties include identifying and eliminating potential accident hazards. The FY 1989 bill for the Institution's Federal portion totals \$881,000. (This bill covers the actual expenses incurred for the period July 1, 1986 through June 30, 1987.) With an amount of \$838,000 in the Institution's base for workers' compensation, additional funds totaling \$43,000 are requested.

OMB Grade Target Reduction - In FY 1985, at the direction of the President, the Office of Management and Budget and the Office of Personnel Management implemented a joint initiative to improve the management of positions and lower the average grade levels in the 11-to-15 grade range. Thus far, the reduction assessed the Smithsonian is \$1,306,000. A final sum of \$186,000 will be relinquished in FY 1989. The cumulative reduction over five years is \$1,492,000.

UTILITIES, POSTAGE, AND COMMUNICATIONS - In FY 1988, a base of \$18,756,000 is anticipated to fund the costs of electricity, steam, gas, fuel oil, water, postage and communications of nearly all Institution facilities including the Quadrangle. Due primarily to increased consumption associated with full operation of the Quadrangle, the acquisition of the Old General Post Office Building, as well as continued installation and upgrading of computer equipment throughout the Institution, an amount of \$950,000 is sought to cover higher costs of these items.

Projections of future year utilities costs are based on analyses which take into account a variety of factors. These include comparative data on actual energy consumption in previous years for each facility; adjustments for normal weather conditions for this area based on information provided by the National Weather Service; actual and projected rates charged by utility companies; actual and anticipated reimbursements for utility costs from concessions, museum shops, and the Friends of the National Zoo; modifications to work and public spaces within facilities; vigorous energy conservation efforts under way in all Smithsonian buildings; improvements to heating, ventilating and air conditioning systems and components installed throughout the physical plant; the design of new facilities constructed; and anticipated increases in consumption due to the installation of computers and other equipment used throughout the Institution in support of program objectives.

The following table shows the costs and base funds available to cover the components of the Utilities account between fiscal years 1987 and 1989.

ANALYSIS OF UTILITIES AND COMMUNICATIONS COSTS

FY 1987 - FY 1989

	<u>FY 1987</u> <u>ESTIMATE</u>	<u>FY 1988</u> <u>ESTIMATE</u>	<u>FY 1989</u> <u>ESTIMATE</u>
<u>ELECTRICITY</u>			
<u>Use</u> - Millions of KWH	107.8	114.3	117.4
<u>Unit Cost</u> - Average per KWH	.068	.070	.072
<u>Cost</u> - \$000's	\$7,312	\$8,003	\$8,450
FY 1989 Estimated Cost			\$8,450
FY 1988 Estimated Base			<u>\$7,703</u>
Base shortage, Electricity			\$ 747
<u>STEAM</u>			
<u>Use</u> - Millions of Pounds	190.0	214.1	217.6
<u>Unit Cost</u> - Average per 1,000 lbs.	15.5	15.5	15.5
<u>Cost</u> - \$000's	\$3,103	\$3,318	\$3,372
FY 1989 Estimated Cost			\$3,372
FY 1988 Estimated Base			<u>\$3,318</u>
Base Shortage, Steam			\$ 54
<u>GAS</u>			
<u>Use</u> - Millions of Cubic Ft.	1.249	1.249	1.249
<u>Unit Cost</u> - Average per Cubic Ft.	.6605	.7206	.8006
<u>Cost</u> - \$000's	\$825	\$900	\$1,000
FY 1989 Estimated Cost			\$1,000
FY 1988 Estimated Base			<u>\$1,100</u>
Base Surplus, Gas			\$ 100
<u>FUEL OIL/WATER</u>			
<u>Cost</u> - \$000's	\$235	\$250	\$300
FY 1989 Estimated Cost			\$300
FY 1988 Estimated Base			<u>\$250</u>
Base Shortage, Fuel Oil/Water			\$ 50
<u>TELEPHONE</u>			
<u>Cost</u> - \$000's	\$3,402	\$3,664	\$3,884
FY 1989 Estimated Cost			\$3,884
FY 1988 Estimated Base			<u>\$3,535</u>
Base Shortage, Telephone			\$ 349
<u>POSTAGE</u>			
<u>Cost</u> - \$000's	\$1,650	\$1,850	\$2,050
FY 1989 Estimated Cost			\$2,050
FY 1988 Estimated Base			<u>\$1,850</u>
Base Shortage, Postage			\$ 200
<u>TOTALS</u>			
			\$19,056
			\$18,756
			<u>\$ - 350</u>
			\$ 950

Electricity - The major component of the Utilities account is electricity. Estimates of electrical usage and consumption take into consideration full occupancy of the Quadrangle as well as anticipated fuel rate adjustments. Although energy conservation efforts remain in effect and have shown demonstrable impact on consumption over the past several years, acquisition of the Old General Post Office Building as well as continued installation and upgrading of computer equipment throughout the Institution are expected to result in increased consumption. As a result, \$747,000 in additional base funds are required to cover the estimated electricity costs in FY 1989.

Steam - The projected deficit of \$54,000 for steam is attributable primarily to the full operation of the Quadrangle and the acquisition of the Old General Post Office Building.

Gas - Rates for gas have been estimated based on lower actual costs in FY 1987, resulting in a projected surplus of \$100,000 in FY 1989.

Fuel Oil and Water - The estimated shortage of \$50,000 for fuel oil and water is attributable to larger than anticipated consumption at the Tropical Research Center and the Conservation Research Center at Front Royal, Virginia.

Telephones - Efforts continue to limit telephone costs through increased monitoring and review of long distance calls by management officials, limited access to long distance lines to reduce the possibility of abuse and increased monitoring of telephone charges. Despite these efforts, an additional \$349,000 is requested in FY 1989 to enable the Institution to meet all telephone costs. Additional funds are requested to allow the Institution to continue expanding data communication capabilities, particularly those involving wide access to payroll, personnel and collections management information and other data bases from remote locations. Additionally, expected costs associated with the FTS 2000 long distance network, administered by the General Services Administration, are expected to contribute to the increase.

Postage - On-going efforts to contain postage costs continue to limit the increases necessary for providing postage services to the Institution. Elimination of first class domestic package mailings and reduced express mail services for domestic mailings have been successful in reducing postage costs. Despite these successes, the Institution is projecting a \$200,000 deficit for postage due to the proposed increase of first class postage rates approved in FY 1987 and the corresponding rate increases for other classes of mailings, as well as the increased volume of mailings associated with program activities and public information requests.

Energy Conservation - The Institution is continuing efforts to monitor and limit all forms of energy consumption. On-going efforts include utilizing a computer-based energy management system that reduces peak energy demands by cycling motors on and off, and, when necessary, selectively shutting down equipment and monitoring all buildings for fluctuations or malfunctions in their operating systems; continuing the phased program of performing comprehensive building energy audits; renovating heating, ventilating and air conditioning, plumbing and electrical systems within the Institution's facilities; and reducing lighting levels in work and non-public areas. Additional efforts include installing more efficient lighting fixtures; operating heating and air conditioning systems at the minimum level necessary to prevent damage to the collections; curtailing electrical

consumption during non-public hours; and increased attention to energy conservation when determining space use, modifying existing space and designing new facilities.

RENTAL SPACE - For FY 1989, an amount of \$380,000 for the central rental account, managed by the Office of Plant Services, is required not only for the Federal proportional share of the rental expenses for administrative activities located at L'Enfant Plaza and the Smithsonian Institution Service Center at 1111 North Capitol Street, but also for the research bureaus of the Archives of American Art in New York City and Boston, Massachusetts. The amounts shown on the following table reflect anticipated costs for rental space at these sites:

FEDERAL RENTAL PROGRAM ADMINISTERED BY THE OFFICE OF PLANT SERVICES
FY 1987 - FY 1989

	FY 1987		FY 1988		FY 1989	
	Estimated Cost		Estimated Cost		Estimated Cost	
	<u>Federal</u>	<u>Trust</u>	<u>Federal</u>	<u>Trust</u>	<u>Federal</u>	<u>Trust</u>
L'Enfant Plaza	\$ 360	\$930	\$ 396	\$942	\$ 845	\$ 968
North Capitol St.	930	--	1,017	--	950	139
Archives of American Art:						
- New York	61	--	130	--	155	--
- Boston	<u>7</u>	<u>--</u>	<u>8</u>	<u>--</u>	<u>13</u>	<u>--</u>
Total Costs	\$1,358	\$930	\$1,551	\$942	\$1,963	\$1,107
Base	<u>\$1,349</u>	<u>\$930</u>	<u>\$1,583</u>	<u>\$942</u>	<u>\$1,583</u>	<u>\$1,107</u>
Surplus/(Deficit)	\$ (9)	\$ --	\$ 32	\$ --	\$(380)	\$ --

The unique organizational status of the Smithsonian Institution presents an on-going dilemma for maintaining parity between Federal and Trust support for Institutional administrative costs, with special consideration given to revenue producing activities. Since FY 1980, the rental space at L'Enfant Plaza and North Capitol Street has been designated as a shared Federal/Trust expense, as these locations accommodate certain administrative functions supporting both Federal and Trust activities in addition to various program activities. Heretofore, the method of cost sharing between Federal and Trust funds for the rental account has been based on proportional cross program expenditures, without acknowledging actual space usage at either location and other alternatives for isolating the administrative costs. This approach is essentially flawed, since it is based on total costs incurred by a program rather than staff costs or space necessary to administer the program.

Over the past few years, space utilization at both locations has changed as has the administrative space requirements for auxiliary activities within non-rented Smithsonian Institution buildings. Consequently, during the periodic review of cost allocation methods, the sharing of rental expenses became an area of concern. Based on a review of the current rental space utilization and the

algorithm for administrative rental expense distribution, the decision has been made to use an alternative method based on programmatic salary costs to allocate shared expenses. The new method is consistent with the approved allocation of indirect costs (including rent) to government grants and contracts by the Defense Contract Audit Agency/Office of Naval Research (DCAA/ONR), yields a more valid comparison of administrative activity, and results in a more equitable distribution of related rental costs between Federal and Trust support.

In addition, the new approach incorporates expenses for administrative space previously borne exclusively by either Federal or Trust funds. For example, the rental property at the North Capitol Street Service Center has been supported by Federal funds with offsetting payment for the Museum Shops warehouse space, until the relocation of that operation in FY 1986 when the total costs were then sustained by appropriated funds. Now, however, cost sharing from the Smithsonian Institution Press and Smithsonian Magazine as well as administrative activities occupying space at this facility also will be recognized.

The estimate for FY 1989 Federal costs for L'Enfant Plaza, which reflects annual cost increases specified in the lease agreement, includes support from appropriated funds for all program space, such as the Office of Folklife Programs and the Office of Fellowships and Grants. The expense allocation for applicable administrative space is based on the ratio of Federal and Trust program salary expenses. In addition, the Smithsonian Institution Press rent costs are allocated on the ratio of Federal to Trust salaries to recognize the dual nonprofit/for-profit function of the Press, including production of research and educational materials, government forms, manuals and reports as well as marketing books and recordings. The policy of charging equivalent rent to the auxiliary activities, specifically Smithsonian National Associates Program, Resident Associates Program and the Smithsonian Magazine will continue. That is, these activities are charged for the administrative office space that they occupy in non-rented Institution buildings according to the number of square feet occupied times the equivalent rental costs per square foot of space at L'Enfant Plaza. Payments by the auxiliary activities, including the Smithsonian Institution Press, partially offset the total rent charge for L'Enfant Plaza.

The total rental expense for space at 1111 North Capitol Street also reflects the annual cost increase specified in the current long-term lease agreement. The Federal/Trust proportional share is based upon the aforementioned allocation of administrative space with programmatic rental space supported by appropriated funds.

The rental expenses for the Archives of American Art have been revised to acknowledge the unavoidable delays in occupying the proposed new facilities. However, it is anticipated that the new space, located in the area where New York's art museums and galleries are concentrated, will be fully occupied in early FY 1988. An additional amount of \$25,000 is required for FY 1989. An amount of \$5,000 is required for the Archives of American Art's Boston location to cover annual cost increases specified in the lease agreement.

The Federal share projected for the Central rental account in FY 1989 totals \$1,963,000. A sum of \$1,583,000 is anticipated for FY 1988. Therefore, an additional amount of \$380,000 is required to defray space rental costs at these locations in FY 1989.

INFLATION - Resources totaling \$1,300,000 are requested to help offset the cumulative and anticipated costs to the Smithsonian as a result of estimated inflation. The amount requested represents 2.8 percent of total nonsalary expenses estimated for FY 1988, excluding costs of utilities, rent and the Museum Support Center move and equipment. Inflationary increases represent significant costs that have the cumulative effect of seriously eroding research, exhibitions, collections management, education and public orientation programs, as well as facilities management and administrative services. The result of inflation, therefore, is equivalent to a significant reduction each year to the base resources of all the Smithsonian's approximately 65 organizational units.

Research - Cost increases have a severe effect on the Institution's ability to carry out its programs. In the area of scientific research, prices for scientific supplies generally are not increasing as dramatically as they have in the past. However, the bureaus continue to experience higher prices for the maintenance and repair of sophisticated scientific equipment. For example, one maintenance contract for a scanning electron microscope cost \$9,475 in FY 1987 is estimated to increase in cost in FY 1988 to \$10,450, an increase of ten percent. The National Air and Space Museum has experienced a cost increase for the maintenance of the Zeiss Planetarium instrument which is serviced by West German technicians. The cost of this service rose from \$5,600 to \$6,865 over a few months, a 22 percent increase. This increase was primarily due to the decline of the value of the United States dollar against the deutsche mark.

The effects of inflation on costs for books, journals, as well as research related items, have affected virtually all of the Institutions programs. The Smithsonian Institution Libraries (SIL), which is responsible for purchasing all books for the Smithsonian, reports that the average subscription price for SIL journals has risen from \$107 to \$133 since 1985, an increase of 24 percent. The annual subscription rate for some journals that Smithsonian researchers find indispensable are rising dramatically in price. The following are examples: "Zoological Record" - the 1986 price was \$1,317 and the 1987 price was \$1,900, a 44 percent increase; "Abstracts in Anthropology" - the 1986 price was \$89 and the 1987 price was \$196, a 120 percent increase; and the "Journal of Molecular Evolution" - the 1986 price was \$191 and the 1987 price was \$414, a 117 percent increase. SIL is taking steps of cancelling subscriptions which have peripheral interest and reducing the serials list by an additional ten percent. Even though SIL will begin to use the resources of commercial document delivery services on an increasing basis and will increase its interlibrary loan borrowing to further avoid housing materials on site, these steps will only partially offset the pressure of inflation on the serials' budget.

The Smithsonian's strength as a research institution is bolstered by the quality of its research support operations. The Institution's researchers depend heavily on the timely receipt of new information. The Institution's book buying power has already been severely reduced because of the increasing costs of books, the growing number of publications of interest to Smithsonian staff, and across-the-board budget reductions. If the trends continue and serious gaps remain and grow in core collections of the Institution, the Smithsonian will inevitably lose credibility as having a research library adequate for the requirements of its research staff.

Inflation is also eroding the purchasing power of research support dollars in the area of supplies and equipment. The chart below illustrates examples of price increases for research related items that are purchased regularly.

Research Equipment and Supplies

<u>Item</u>	<u>FY 1986</u> <u>Cost</u>	<u>FY 1987</u> <u>Cost</u>	<u>Percentage Increase</u>
Glass microfiber filers	\$ 53.80	\$ 64.25	19 percent
Lab black ink	5.88	7.20	22 percent
Flask, volume metric 100ml, Pkg.of 6	93.92	97.88	4 percent
Polaroid 600 film,			
Type 52, polaplan, case	262.50	272.00	4 percent
Type 55, positive and negative	284.00	294.00	4 percent
Type 107, case	245.00	255.00	4 percent
Paper, Kodak, 8"x10", 250 sh.	60.41	62.82	4 percent
Film, Kodak, Tri X/T-Max 400	2.42	2.69	11 percent
Weighing paper, 500 sh./pkg.	6.25	9.50	52 percent
Balance desiccator	7.25	9.00	24 percent
Liquid pressurized nitrogen/160 L.	64.83	72.83	12 percent
Filter paper, pkg.	2.34	3.00	28 percent
Methyl-8 concentrate, 10ml	30.00	35.00	17 percent
Propyl-8 concentrate, 5ml	30.00	35.00	17 percent
Aminosyn (IV fluid) 12 bls/case	123.00	129.76	5 percent
IV Sets, 48 per case	75.50	79.72	6 percent

Collections Management - Comprehensive collections management programs, essential to the preservation of the invaluable objects of the Institution, are not immune from inflationary effects and some price increases in this area are expected to be significant. A list of examples illustrating cost increases for collections management type items follows.

Collections Management Equipment and Supplies

<u>Item</u>	<u>FY 1986</u> <u>Cost</u>	<u>FY 1987</u> <u>Cost</u>	<u>Percentage Increase</u>
Drop-front print boxes, 16"x20"x3"	\$ 3.40	\$ 4.45	31 percent
Drop-front print boxes, 14"x11"x3"	2.70	3.50	30 percent
Aircraft paint	867.00	976.00	13 percent
Fuser oil, per bottle	14.00	20.00	43 percent
Adhesives, beva, per can	65.00	95.00	46 percent
Varnish, solivar, per qt.	12.70	14.68	16 percent
Cotton, per case	118.75	158.00	33 percent
Dissecting scissors, per pair	30.00	33.60	12 percent
Chemical-benzine, per can	43.38	50.70	17 percent
Hygrothermograph maintenance svc/yr	161.25	186.94	16 percent
Ethafoam, 4'x8'x3/11"	23.76	31.46	32 percent
Fomecor, 4'x4'	7.50	11.50	53 percent
Glassine, 60"x100yds., roll	63.00	72.80	16 percent
Polyethylene, 10' roll	18.00	19.75	10 percent
Fine watercolor brushes, #0, ea.	5.60	7.45	33 percent

Cloth rags, per carton	120.00	175.00	46 percent
Vulpex conservation solvent, per qt.	26.65	32.60	22 percent
Mounting board	16.85	21.50	28 percent

Exhibitions - Inflationary increases for shipping, materials, and supplies place a severe strain on the base resources needed to maintain an active exhibition program. The cost of some materials for producing high quality exhibitions has greatly increased in the past year and inflationary cost increases are anticipated for 1989, especially for the petroleum products. Great care is taken in selecting the appropriate materials for exhibition construction. Certain occasions demand that special lighting be required not only as a comfort for the viewer, but as a requirement for a delicate object on display. Frequently, such lamps, exhibiting particular qualities, are expensive to purchase. The chart below illustrates cost increases for several items used extensively in exhibits preparation.

Exhibition Materials

<u>Item</u>	<u>FY 1986</u> <u>Cost</u>	<u>FY 1987</u> <u>Cost</u>	<u>Percentage Increase</u>
Paint, white latex, gal.	\$ 11.55	\$ 13.64	18 percent
Plexiglas:			
1/8"x4'x8' UF3, sh.	98.70	126.72	28 percent
1/4"x4'x8' UF3, sh.	134.20	180.16	34 percent
1/4"x4'x8' clear, sh.	87.04	106.24	22 percent
Gatorboard, 1/4"x4'x8'	34.50	48.43	40 percent
Bristle brush, 38cm	16.00	16.69	4 percent
Camel hair brush, 23cm	5.80	6.09	5 percent
Blueprint paper, 23"x34", 250 sh.	22.76	24.43	7 percent

Facilities Management and Administration - The effects of inflation in the administrative and facilities management areas are felt when purchasing custodial and building maintenance supplies and equipment; in the costs of security and safety items vital to the protection of visitors, collections and staff; and in computer maintenance and training. Vendors of computer hardware and software advise an increase of nine percent over current FY 1987 prices for machine maintenance and an increase of eight percent for professional fees and training costs for FY 1988. Other examples of higher prices in this area are listed in the table below.

Administrative and Buildings Maintenance Supplies and Contracts

<u>Item</u>	<u>FY 1986</u> <u>Cost</u>	<u>FY 1987</u> <u>Cost</u>	<u>Percentage Increase</u>
Bucket, mop, 35 OT	\$ 27.48	\$ 28.86	5 percent
Connector, AH 6269, Nylon, 15A/125V	53.80	95.10	77 percent
Pipe, PVC, schedule #40, 3/4"	5.20	6.40	23 percent
Filter, T/A, 5700, 24x24x2"	1.34	2.54	90 percent
Cloth, terry, cotton	142.00	149.00	5 percent
Wringer, mop 16-24 oz.	43.54	44.64	3 percent
Vacuum, carpet, 28" 2-HP	837.00	920.00	10 percent

Trash receptacles	12.60	13.85	10 percent
Lamps:			
Fluorescent, F4 OCW/U/6, each	5.96	7.49	26 percent
Incandescent, 75PAR/SP 65WM	4.92	7.66	56 percent
Gloves, work	4.25	5.50	29 percent
Annual Contracts:			
Uniform cleaning (one museum)	8,420.00	8,719.00	4 percent
Combustible waste disposal (one museum)	19,500.00	23,000.00	18 percent
Pest control (one museum)	2,420.00	2,662.00	10 percent
Information Handling Svc. (microfilm reference documents)	2,791.00	2,941.00	5 percent
Copier rental	1,530.00	1,602.00	5 percent
Televideo terminal, maintenance	165.00	183.00	11 percent

The request of 2.8 percent increase to nonsalary funds is a modest one. The additional proposed resources of \$1,300,000 are vital to the integrity of virtually all programs of the Institution and will assist in restoring lost purchasing power due to the effects of inflation.

OFFICE OF THE ASSISTANT SECRETARY FOR RESEARCH

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	30	1,233	1	93	--	4	16	772	--	699
FY 1988 Estimate	30	1,263	1	152	--	1	7	411	--	718
FY 1989 Estimate	30	1,263	1	152	--	111	3	441	--	223

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Research provides guidance, planning and overall policy direction to the Institution's research efforts and to research support activities. In carrying out these duties, the Office is responsible for tracking research trends both internally and externally in the arts, humanities and sciences. Also included in this line item is the Joseph Henry Papers, which is a documentary publication project dedicated to collecting, transcribing, editing, and publishing the manuscripts of Joseph Henry, a pioneer American physicist and first Secretary of the Smithsonian Institution. No program increase is requested for FY 1989.

PROGRAM - I. The Office of the Assistant Secretary for Research: This Office, in concert with the Secretary and other appropriate management staff, supervises the research activities of the Institution. The Office also serves as the major institutional liaison for research centers in the United States and abroad.

A fundamental responsibility of this Office is the development of guidelines to ensure the superior quality of research conducted at the Institution. This entails providing guidance on shifts of emphasis, suggestions for new areas of research, and access to state-of-the-art facilities and equipment, and advising on the selection and promotion of scholarly staff. In addition, the Office strives to better disseminate Smithsonian research findings to the public and to specialized audiences.

Carbon Dating Services - Contract services for dating, cleaning, and conserving objects is significant to Smithsonian research in such areas as anthropology, geology, and paleontology. In FY 1987, the Institution established a competitive fund to support carbon dating. Proposals are submitted and reviewed by an internal committee for scholarly merit and cost efficiency. This fund has proved to be extremely beneficial in contracting for services which lead to the acquisition of valuable data for a range of research projects.

Solar Research Studies - The Smithsonian pioneered studies in the collection of solar data, particularly with respect to the measurement of ultraviolet radiation. The solar studies program has been enhanced by a new collaboration between the Institution and the National Oceanic and Atmospheric Administration. The new effort has focused not only on studies of the solar spectrum, but on its effects on the Earth. These studies are addressing such topical issues as the atmospheric concentration of ozone. In particular, monitoring has begun in Antarctica to look at the hole in the ozone phenomena which may be a key to future understandings of atmospheric conditions. In addition, the researchers are seeking to determine if ozone shifts are a natural occurrence or a man-made phenomenon. These studies are of utmost importance if man is to avert the deadly effects of the shifting concentrations of atmospheric ozone. In FY 1989, a major effort will be made to analyze voluminous data sets previously accumulated and develop a system for rapid dissemination among the user community.

II. The Joseph Henry Papers - The Joseph Henry Papers collects, transcribes, edits, researches, and publishes the manuscripts of Joseph Henry. This entails extensive searches in this country and abroad for extant Henry documents. Publication objectives include a 15-volume letterpress series, an indexed microform edition of approximately 90,000 items, and special publications aimed at a more general audience. The Papers of Joseph Henry is a source of otherwise unpublished and often previously unknown letters and papers that shed light on the history of science, the development of Federal policy towards the sciences, and on the institutional and social structure of the scientific community of the 19th century.

The Henry Papers project serves also as an essential resource for research in the history of science and the cultural history of the United States. Copies of the manuscripts located by the staff provide the scholarly community with a centralized source of documentation relating to Joseph Henry and his colleagues, complemented by the Bell-Henry Library. The Bell-Henry Library is maintained by the Project and contains the personal libraries of both Alexander Graham Bell and Joseph Henry. Requests for access to both the manuscript collections and the library by Smithsonian staff, Smithsonian Fellows, and visiting scholars increased sharply during FY 1987.

The Henry Papers is completing work on the sixth volume of the series and publication is expected in FY 1988. This volume, covering the years 1844-1846, details the end of Joseph Henry's professorship in natural philosophy at the College of New Jersey (now Princeton University) where he was still actively engaged in experimentation in electricity and magnetism. It also chronicles the establishment of the Smithsonian Institution and Henry's selection as its first Secretary in December 1846. Editorial work on the seventh volume, which will document the years 1847-1849, will commence in FY 1988 and continue into FY 1989. The focus of this volume will be Henry's efforts to ensure that the Smithsonian's primary function is the support of original research. By the end of the FY 1989, the Henry Papers plans to be fully automated, allowing the seventh volume of the series (and the first of the Smithsonian Years) to be prepared entirely on computers. Further systemization of the data gathered during the editing of the Henry manuscripts will allow for greater quantitative analysis.

The Henry Papers will continue its sponsorship of the 19th Century Seminar and its educational outreach and cooperative activities. The 19th Century Seminar, an academic forum, presented speakers from a number of countries, including Australia and the Federal Republic of Germany, in FY 1987. These works-in-progress seminars

will continue to provide the scholarly community the opportunity to hear and discuss topics common to the 19th century with historians from throughout the world. During FY 1987, the Henry Papers hosted a Smithsonian predoctoral fellow and three interns, including a minority student. It also provided the guest curator for the National Museum of American History's exhibition celebrating the tricentennial of Newton's Principia.

NONAPPROPRIATED SOURCES OF FUNDING:

I. The Office of the Assistant Secretary for Research: Unrestricted General and Special Purpose Funds - These funds are provided by annual allotments and are used primarily to support three significant international foundations which operate field research stations used by Smithsonian staff members as well as by the world scientific community: the Seychelles Islands Foundation operates the former Royal Society station on the Island of Aldabra, located in the Indian Ocean, where biological research is conducted; the Charles Darwin Foundation operates a biological research station in the Galapagos Islands; and the King Mahendra Trust for Nature Conservation provides scholars with access to a unique environment on the Indian subcontinent by operating a field station in the terai region (a lowland, grassy plain) of Nepal where significant ecosystem research is in progress. Smithsonian support facilitates the continued accessibility of these areas for the research community at large. Support also is provided for the exchange of scholars and scientific information between the Smithsonian and a number of nations, principally, the People's Republic of China and Cuba.

Restricted Funds - These consist of restricted endowments, gifts and grants from individuals, foundations and corporations which specify the use of the donation or bequest. Competitive awards are made to Smithsonian units from the Seidell Endowment Fund, administered by this Office, which provides for dissemination of scientific information. The FY 1987 awards from the Seidell Endowment are reflected in the expenditures of the recipient organizations. Ecotechnics provided support to develop and construct a Chesapeake mesocosm and later a tropical estuarine mesocosm.

Government Grants and Contracts - Contract funds have been provided by the Office of Naval Research for the continuation of studies in the area of manpower research and development. A grant from the Agency for International Development (AID) provides funds for the continuation, expansion and operation of the research laboratory at Grand Turk Island.

II. The Joseph Henry Papers: Restricted Funds - The Joseph Henry Papers will receive support in FY 1988 from the National Academy of Sciences and the Richard Lounsbery Foundation. These funds will be used to provide the Joseph Henry Papers with a research assistant to aid in the production of the manuscript volumes of the letterpress edition. The Smith College Tuition fund will be used to defray costs of research by the support staff and volunteers. None of these funds are anticipated to recur in FY 1989.

Funding from the National Science Foundation is anticipated in FY 1988 and will partially defray the costs of a Joint Seminar on nationalism and internationalism in science in conjunction with the Australian bicentennial.

SMITHSONIAN ASTROPHYSICAL OBSERVATORY

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	103	9,760	49	2,866	43	1,390	--	151	92	14,134
FY 1988 Estimate	105	9,692	51	2,977	43	1,748	--	140	94	12,949
FY 1989 Estimate	105	9,812	51	3,078	43	1,600	--	28	100	19,518

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Astrophysical Observatory (SAO) located in Cambridge, Massachusetts, conducts basic astrophysical research in the following interrelated disciplines: atomic and molecular physics, high energy astrophysics, optical and infrared astronomy, planetary sciences, radio astronomy and geoastronomy, solar and stellar physics, and theoretical astrophysics. SAO cooperates in its scientific programs with the Harvard College Observatory (HCO), and together the two observatories form the Center for Astrophysics (CfA). SAO also operates the Fred Lawrence Whipple Observatory (FLWO), on Mt. Hopkins, Arizona, the site of the Multiple Mirror Telescope (MMT), a joint project with the University of Arizona.

Scientific data are obtained from laboratory experiments conducted in Cambridge; telescopic observations, especially at FLWO; and space observations utilizing satellites, rockets, and balloons. The reduction and analysis of these data are performed mostly with SAO's computer systems in Cambridge. The resulting astrophysical information and scientific interpretations are published in scientific journals and reports. These results are also conveyed to the scientific community and to the public through lectures and more general articles and books.

For FY 1989, an increase of \$120,000 is requested to meet increased space rental costs for SAO facilities in Cambridge, Massachusetts. Funding for two SAO projects, the development of a submillimeter telescope array and the conversion of the Multiple Mirror Telescope, is requested under the Major Scientific Instrumentation line-item. (In view of this new line-item, the FY 1988 and FY 1989 estimates given in the present section reflect a decrease of \$525,000 associated with the conversion of the MMT, since this amount is proposed for transfer to the new line-item.)

PROGRAM - SAO is a leading international astrophysical research center. The Observatory was founded in 1890 by Samuel Pierpont Langley, the third Secretary of the Institution, and moved to Cambridge, Massachusetts in 1956. SAO has pioneered

in studies of solar-terrestrial relationships; establishment of a worldwide network of stations to track the first artificial earth satellites; application of new technology to telescope design; discoveries of cosmic X-rays; and surveys of the distribution of galaxies in space. SAO's leadership in astrophysics grows out of a broad and diversified approach to research. Observations at radio, infrared, optical, ultraviolet, and X-ray wavelengths involving innovative designs are combined with theoretical studies to provide deeper understanding of astrophysical processes.

SAO's research programs are concentrated in seven divisions, with the different efforts largely complementing each other: atomic and molecular physics, high energy astrophysics, optical and infrared astronomy, planetary sciences, radio astronomy and geoastronomy, solar and stellar physics, and theoretical astrophysics. SAO also maintains an engineering department, a computational facility, and an extensive astronomical library. In addition, because it is located outside the Washington metropolitan area, SAO has its own administrative support structure funded by Federal funds and by indirect charges to grants and contracts.

SAO also operates the Minor Planet Center and the Central Bureau for Astronomical Telegrams for the International Astronomical Union (IAU). The Central Bureau for Astronomical Telegrams is responsible for receiving, verifying, cataloguing and disseminating information about transient astronomical phenomena such as the discoveries of comets and asteroids that approach the Earth, and of novae and supernovae. For comets and asteroids, the Bureau computes orbits and provides information on where the objects can be observed in the future. The Bureau provides such information to 750 astronomers and observatories around the world. The Minor Planet Center concentrates on asteroids and comets and provides detailed information on these objects to some 250 subscribers worldwide.

The past year produced a number of significant scientific accomplishments by SAO scientists:

-- The major event of the year in astrophysics was the supernova explosion in the Large Magellanic Cloud. This supernova, the brightest in almost 400 years, offered an unparalleled opportunity for study with an extraordinary variety of instruments. Scientists from SAO quickly headed to the Cerro Tololo Observatory in Chile bringing a new electronic camera they had designed and built. They used a new technique of astronomical imaging--rapid picture taking to avoid the blurring caused by motions in the earth's atmosphere--to photograph the supernova. The images showed the supernova, but they also revealed a close-by companion object that is almost one tenth the brightness of the supernova. Since the supernova is as bright as billions of normal stars, this companion object is also incredibly bright, and must have been created by the supernova since it was not there before the explosion. Its presence is baffling theorists and observers, and further observations by SAO scientists are underway; the results are eagerly awaited by the scientific community.

-- Why did dinosaurs disappear about 65 million years ago? Was it the result of comets crashing into the Earth, thus raising vast dust clouds that choked off the sunlight and killed the dinosaur's food supply? This view has gained wide acceptance but how these comets came to be in a position to hit the Earth is a subject of some controversy. One speculation is that the sun has a very distant and faint companion star, nicknamed Nemesis, that takes almost 23 million years to complete one orbit around the sun. Each time Nemesis passes the vicinity of the

sun it produces small tugs on the myriads of comets thought to reside on the outer fringe of our solar system. Some of these comets would thereby be deflected into the inner solar system, according to this theory, and a tiny fraction of them could crash into the earth. However, observations made by an SAO scientist indicate that a companion star such as Nemesis is not likely to exist in orbit about the sun. A survey of 250 stars similar to the sun showed that none has a companion as far away from it as is required for the separation of Nemesis from the sun; any two stars in such a configuration would have been disrupted early on by chance encounters with other stars.

-- Using interferometric techniques developed at radio wavelengths, SAO scientists have built an optical interferometer having extremely high angular resolution. The instrument, a stellar interferometer erected at the Mt. Wilson Observatory in California, is part of a joint project of SAO, the Massachusetts Institute of Technology, the Naval Research Laboratory, and the Naval Observatory. This interferometer was completed in the fall of 1986 and began a major campaign of daily observations in 1987 to determine the positions of stars on the sky to an accuracy 10 to 100 times greater than that achievable with conventional telescopes. The angular diameters of a large number of stars also will be measured for the first time; in addition, the instrument will be used to search for massive planetary companions of nearby stars.

These and other research results obtained by SAO scientists have been published in scientific journals. Approximately 200 such papers appear each year. A brief summary of the research conducted in each of SAO's seven scientific divisions follows. In each section, the first paragraph describes the research program in general terms and the subsequent paragraphs describe recent accomplishments, in addition to those highlighted above.

Atomic and Molecular Physics - In order to interpret observations of astronomical objects it is necessary to understand the atomic and molecular processes involved. The major objective of the research of the Atomic and Molecular Physics Division is to obtain such information using laboratory and theoretical studies.

SAO scientists are measuring several ways in which oxygen molecules in the Earth's atmosphere can be broken apart by sunlight. In addition, they have made the first theoretical calculation of the rate of production of oxygen atoms by molecules of oxygen which absorb an electron and break apart before the captured electron can escape. These processes are important elements of the chemistry of the ozone in the stratosphere, the layer that protects us from the harmful ultraviolet rays of the sun. They are also vital components for understanding the mechanism of the "greenhouse" effect that is thought to be causing a warming of the Earth.

Carbon monoxide, a single atom of carbon combined with a single atom of oxygen, is one of the most common interstellar molecules. It is also one of the easiest to detect. Astronomers map the distribution of carbon monoxide as a way of tracing the extent of giant clouds of molecules in the Milky Way. But in order to interpret these maps properly, it is necessary to understand the detailed processes by which carbon monoxide molecules are broken down by starlight. Scientists at SAO have calculated ways in which this process may occur and carried out corresponding measurements in collaboration with the Japanese National Laboratory for High Energy Physics, using radiation from their "Photon Factory." Computations made by SAO scientists have also revealed that the simple, and supposedly abundant, molecule

consisting of one atom of hydrogen and one atom of nitrogen can be readily broken down by starlight, explaining the mystery of why such a simple molecule had not been found in the interstellar medium.

High Energy Astrophysics - Research in high energy astrophysics is concentrated on some of the most energetic objects and processes in the universe. Scientific studies are directed at understanding the mechanisms that generate X-ray radiation, the amount of matter in the universe, and the formation, evolution, and ultimate fate of the universe. Observations must be made from balloons, rockets, the Space Shuttle, or satellites, because X-rays are absorbed by the earth's atmosphere. SAO scientists and engineers are currently involved in the analysis of X-ray data and in the design and development of new instrumentation for future space science missions.

Some of the most violent events in the universe take place in the heart of galaxies and the enigmatic objects known as quasars. The mechanism producing this behavior may involve matter falling onto a massive black hole, perhaps a million or even a billion times heavier than our sun. Although these objects radiate immense amounts of energy across the spectrum from low energy radio waves to the extremely high energy X-rays and gamma-rays, their behavior can alter over periods as short as a few days. SAO scientists have been piecing together a picture of the way the emission varies in time in different energy bands. Preliminary results suggest that one process may generate the infrared and X-ray emission, while another process, involving a disk-like structure of material spiraling inward toward the central black hole, may be responsible for the optical, ultraviolet, and lowest energy X-ray radiation that is observed.

Catalogues and maps are important resources for understanding the universe. For example, when the recent supernovae flared in the southern sky, almost the first question asked was, "What was there before--what kind of star blew itself apart with such an enormous release of energy?" That question could only be answered because astronomers had preserved records of their observations of the Large Magellanic Cloud. The X-ray satellite named Einstein, created largely through the efforts of SAO scientists and engineers, produced a priceless archive of observations of 10 percent of the sky. Using these data, SAO scientists have been able to catalogue X-ray sources and to make maps of the distribution of cosmic X-rays. These tools will provide the basis for future systematic studies involving stars, galaxies, clusters of galaxies and quasars.

SAO scientists and engineers are working with the National Aeronautics and Space Administration (NASA) and industry on detailed definition and design studies of the Advanced X-ray Astrophysics Facility (AXAF), one of the major space observatories being planned by the United States for launch in the next decade. With its large increase in angular resolution and sensitivity over all previous X-ray satellites, AXAF has great potential for answering fundamental questions, revealing previously unknown phenomena, and possibly discovering new laws of physics. A particularly important set of objectives is to inventory the content of galaxies and of clusters of galaxies to find out how much material of different kinds exists. The amount and nature of this material is of great importance in our attempts to understand the present state and ultimate fate of the universe.

SAO scientists have developed a novel X-ray telescope for providing high resolution images of the sun. This telescope is scheduled for test on a rocket flight in September 1987. In cooperation with Harvard College Observatory, balloon

flights will also be made of another new type of telescope to observe unusual celestial sources of X-rays at much higher energies than earlier X-ray satellites could study. Results from these flights should provide important insight into the energetic processes that produce these higher energy X-rays and gamma-rays. A special flight of this payload has been scheduled for 1988 to study the recent supernova in the Large Magellanic Cloud.

SAO developed a high resolution imaging X-ray detector for flight on the West German/United Kingdom/United States Roentgen Satellite (ROSAT), tentatively scheduled for launch in early 1990, and has been working with the Goddard Space Flight Center to develop and operate the United States ROSAT data center. In this connection, SAO is developing a portable, maintainable system of X-ray analysis software, based on the Image Reduction and Analysis Facility software developed at the National Optical Astronomy Observatories and at the Hubble Space Telescope Science Institute. This X-ray software system will incorporate much of the experience gained from the Einstein satellite and should provide scientists at all institutions with the tools needed to analyze high-quality X-ray data.

Optical and Infrared Astronomy - Research in optical and infrared astronomy at SAO concentrates on the large scale structure of the universe and on the formation and evolution of stars and systems of stars. In support of this research, SAO operates the Fred Lawrence Whipple Observatory on Mt. Hopkins in Arizona, the site of the Multiple Mirror Telescope (MMT), the third largest telescope in the world, operated jointly with the University of Arizona. SAO also operates two smaller telescopes at Mount Hopkins, used for large scale surveys and for observations in support of research conducted with the MMT. In addition, there is a ten-meter-diameter light collector, the most sensitive in the world for ground-based searches for high-energy gamma rays from celestial sources.

SAO scientists are carrying out a long-term program using the 1.5 meter telescope on Mt. Hopkins to make a three-dimensional map of the distribution of more than 10,000 galaxies within about 300 million light years of our own Milky Way. The first complete slice of this survey produced a striking map which suggested that galaxies are distributed on the surfaces of enormous bubble-like structures. The interiors of the bubbles--vast regions nearly devoid of bright galaxies--extend for more than 100 million light years, comparable with the depth of the survey. Three slices of the survey have now been completed and include more than 2,500 galaxies. The new data confirm the earlier picture developed by SAO scientists of the way galaxies are distributed on very large scales. Using the MMT, these SAO scientists have begun a deeper survey to look for even larger structures. The biggest structures pose the most serious challenge to theoretical models of the evolution of the universe. It is both exciting and sobering to think that we are drawing fundamental conclusions about the properties of the universe from maps which cover a fraction of the visible universe, comparable with the fraction of the earth covered by the state of Rhode Island! As the survey grows larger and deeper, the results are bound to prompt further profound changes in our understanding of the largest frontier--the universe itself.

How old is the universe? One way to approach this question is to look at the expansion of the universe. Most astronomers agree that the universe started with a big bang, with cosmic debris flung out in all directions from the original explosion. The time that has elapsed since the big bang can be calculated if we know how far the debris has gotten, and how fast it is moving. Another way to find how old the universe must be, is to look at the ages of objects in it, such as those of

stars and clusters of stars, and to use stellar evolution theory: the universe must be at least as old as the oldest stars in it. But herein lies a puzzle, because some of the recent values for the expansion age make the universe younger than the oldest stars. Smithsonian astronomers are working on both expansion ages and stellar ages, but still do not know why they disagree. In 1987, a new way was devised at SAO for determining the ages of pairs of stars in orbit about each other, so-called binary stars. The method involves finding the orbital period that divides the binaries with shorter-period circular orbits from those with longer-period elliptical orbits. The orbits of the shorter-period ones have all been circularized by tidal friction. Theory can be used to calculate the age of a population of binary stars from observations that yield the critical period associated with the dividing line between circular and elliptical orbits. This new technique was used by SAO astronomers to date the age of the oldest binaries in our galaxy. Although the new age is still uncertain and needs to be refined by more observational and theoretical work, this first result supports the older age for the universe of approximately 15 billion years.

Planetary Sciences - Research in planetary sciences at SAO strives to provide an understanding of the planets, satellites, and small bodies of the solar system, and the processes that created them billions of years ago.

SAO scientists continue to examine the information obtained during the Voyager encounter with Uranus. Mapping of geological formations from Voyager images of the surface of Jupiter's satellite Ganymede has been completed and analysis of observations of the eclipses and occultations of the bright satellites of Jupiter is being used to study the dissipation of energy in the interior of the planet.

Although the Apollo missions ended over a decade ago, the lunar rocks continue to reveal their secrets. For example, laboratory studies at SAO of Apollo 15 rock samples revealed a previously unrecognized variety of igneous rock in the lunar highlands. This discovery provides new information about the way the lunar surface separated into layers of differing chemical composition.

Where and how comets form is a continuing puzzle. The comets that approach the sun from time to time are believed to come from a halo around the solar system far beyond the orbit of Pluto. Computations by an SAO scientist suggest that as many as two-thirds of these comets may have formed in a region that extends from 1000 to 10,000 times the Earth's distance from the sun.

Although not a planetary phenomenon, the supernova in the Large Magellanic Cloud did play a large role in the activity of some Planetary Division scientists. The Central Bureau for Astronomical Telegrams disseminated several IAU Circulars every day for several weeks after the outburst, and arrangements were quickly made to relay these electronically to astronomers in many parts of the world. Data from a neutrino detector located deep in a mine that is normally used by SAO and other scientists to gather information on neutrinos emitted by the sun, revealed a possible increase in neutrinos at the time of the supernova outburst.

Radio Astronomy and Geoastronomy - Research in radio astronomy concentrates on understanding the structure, evolution, sources of energy, and ultimate fate of the astronomical objects that emit radio waves throughout the universe. SAO scientists are pioneering the use of the radio astronomical technique of very long baseline interferometry (VLBI) to measure directly drifts among the continents and to probe the interior structure of the Earth. Other scientists are developing atomic

clocks, testing the theory of general relativity, designing and building advanced optical interferometers, and designing space tethers to probe the outer reaches of the earth's atmosphere.

SAO scientists continued a major research effort to measure the size of our galaxy and the distance to nearby galaxies. By measuring with extraordinary precision the relative motions of water-vapor masers that surround a newly formed massive star, the distance to the star can be determined. This technique was used to measure the distance to the center of our galaxy. In 1987, a new set of data was acquired to improve the accuracy of this distance determination. First epoch measurements of the motions of two maser complexes in the neighboring galaxy M33 were also made. With data taken over the course of several years, it should be possible to measure the rotation of this galaxy directly--the first time such a measurement has ever been performed.

The large-scale structure of our own galaxy is being probed by measurements of the distribution of carbon monoxide gas which radiates strongly at millimeter wavelengths. The first complete survey of molecular clouds in the galaxy was completed by SAO scientists, and led to the conclusion that in the inner part of our galaxy the amount of matter in the form of molecules is as great as the amount previously seen in the form of atomic gas.

SAO scientists found that a simple model of the energy balance in star-forming interstellar clouds can explain the size, density, and internal motions of more than 100 clouds, ranging in mass from one to one million times the mass of the sun. This model involves a typical cloud supported against its own gravity by a combination of magnetic and thermal pressures. Observational tests of the model are now under way.

Better atomic clocks are being designed and built in support of VLBI research programs at SAO and other observatories, the deep space tracking activities of NASA, and the time-keeping program of the Naval Observatory. A novel method was developed to isolate hydrogen atoms in certain desired atomic states, which will allow improved stability in clocks. Improvements also have been made to a hydrogen maser clock cryogenically cooled to one half a degree above absolute zero. This cold clock is expected to keep time a thousand times more accurately than atomic clocks operating at room temperature.

SAO scientists have also designed a dual optical interferometer for placement in earth orbit to measure the positions of stars with an accuracy a thousand times better than can be achieved from the ground. In 1987, this project was furthered by an internal research and development program at Perkin-Elmer Corporation under which a new kind of optical element was fabricated by methods developed at SAO. This interferometer would be used to search for other planetary systems, to conduct a significant new test of Einstein's theory of general relativity, and to extend the direct measurement of distances to the cosmic scale.

Solar and Stellar Physics - Research in solar and stellar physics is directed principally towards understanding the physical processes operating in the sun and other stars. Stars like the sun are studied in order to increase understanding of the dependence of their properties on age, on composition, and on their physical associations in pairs and in groups. Research in this division includes study of the behavior of hot gas under varied conditions--in extended stellar atmospheres,

in the interstellar medium, and in material ejected from young stars and supernovae.

SAO scientists used the International Ultraviolet Observatory spacecraft to obtain ultraviolet spectra of the 1987 supernova. Spectra obtained in the first hours after discovery show the outer envelope of the star lifting off through the signatures of very hot gas near the supernova that may have been caused by the initial blast of ionizing radiation on the material surrounding the star.

SAO scientists led a team that discovered periodic variations--most probably pulsations--in the bright red supergiant star Betelgeuse in the constellation Orion. Researchers had suspected that this star varied irregularly but the dedicated monitoring of its brightness by the ultraviolet satellite and by telescopes on the ground revealed a distinct 420-day period in the strength of its light. This variation appears to be the signal of a pulsating star, which would provide the answer to the long standing puzzle of how the vast extended atmosphere of this star (about three thousand times the depth of the sun's atmosphere) comes about, and how the massive stellar wind that is observed arises.

Theoretical Astrophysics - Theorists study astronomical systems by means of physical analysis and mathematical modeling. A broad range of topics is investigated, including the interiors of neutron stars, the properties of atoms and molecules in interstellar space, the formation of spiral structure in galaxies, high temperature plasmas, and the formation of planets in the early solar system.

Theoretical studies covered a wide range of topics last year, from interpretations of the first observation of neutrinos from the collapse of the core of a supernovae, to the evolution of localized "inflationary universes" that might appear from the outside to be black holes. Interest in the possible existence of "cosmic strings" as artifacts of the early history of the universe has been widespread. An SAO scientist developed a model to explain how these strings, if they exist, might provide an explanation of the source of the enormous energy generated in quasars. Another SAO scientist analyzed processes that might limit the size of the massive black hole hypothesized to lie at the center of our own Milky Way.

Other work included studies of mechanisms controlling the luminosity of gas flowing into black holes, the formation of planets, and the stability of newly formed galaxies.

Scientific Equipment Replacement and Improvement Program - With funding provided in FY 1984 and following years, SAO has been addressing its most pressing needs to replace and improve old and obsolete laboratory and computer equipment. Funding received as part of the FY 1987 Supplemental Appropriations will partially offset the cumulative erosion of this base as the result of across-the-board reductions in FY 1985 through FY 1987. The effectiveness of existing laboratory equipment is being substantially enhanced by microprocessor-controlled data acquisition and data presentation capabilities. A significant beginning is also being made in establishing a system of distributed computers at SAO. Computer workstations and their associated disk- and tape-drive memories are now linked together in an Observatory-wide Ethernet system. This system allows some easing of the pressures on SAO's still very overloaded central computers.

Education Program - SAO conducts regular programs of public information and education, including popular lectures, "Observatory Nights for the Public" in Cambridge, and guided bus tours of the Whipple Observatory in Arizona. SAO also conceived and is leading an extensive program of development of curriculum materials for using examples from astronomy to teach the principles of science and mathematics in the Nation's high schools.

Development of Scientific Instrumentation - Beginning in FY 1989, funding is requested under the Major Scientific Instrumentation line-item for two projects for the Smithsonian Astrophysical Observatory: (I) the development of an array of submillimeter telescopes; and (II) the conversion of the Multiple Mirror Telescope. Both of these cutting edge scientific projects involve the fabrication of major new instrumentation that will take a number of years to plan, design and complete. The development of the submillimeter array is anticipated to continue through the mid-1990s and will require total funding currently estimated at \$30 million (FY 1987) for construction on a continental site; the cost would be about 25 percent higher if the array were located on a prime mountain site in Hawaii. The conversion of the Multiple Mirror Telescope, which might be completed as early as 1992, would require total estimated funding from the Smithsonian of \$10 million.

Facilities Development - With funding requested as part of the Construction appropriation in FY 1988, a new base camp for the Whipple Observatory will be designed and constructed. A large astronomical observatory such as the Whipple requires public display areas, tool shops, vehicle maintenance and storage areas, computation and drafting facilities, space for the receipt and shipment of equipment and supplies, and administrative offices, all with access to major transportation routes in order to coordinate activities in several locations. The proposed new base camp will provide space for all of these functions. Its facilities will include the Administrative Building and Visitor Center, with space for purchasing, fiscal, engineering and secretarial support, and for displays and briefings about the activities conducted at the Observatory; a vehicle maintenance shop, with service and storage space to accommodate more than 60 vehicles, primarily buses and heavy machinery used for road maintenance; and a warehouse facility.

EXPLANATION OF PROGRAM INCREASE:

Research: Rent Increase (\$120,000) - For FY 1989, an increase of \$120,000 is requested to cover the annual increased space rental costs for SAO's facilities in Cambridge, Mass. First of all, SAO is faced with payment of its portion of the required renovation of the Harvard College Observatory (HCO) buildings which it rents. (For example, the electrical system in one of these buildings dates from 1931 and is in serious need of major renovation.) SAO's payment of its share of the cost of these renovations comes in the form of an increase in the annual lease cost per square foot of its occupancy of these buildings. After the renovations are completed, yearly costs are projected to be \$11.67 per square foot in FY 1989, up \$3.43 over the current FY 1987 cost per square foot, but still a very reasonable rate considering commercial leases in the area that are now in the range of \$20 to \$30 per square foot per year. SAO also had to accommodate the move of the Optical and Infrared Astronomy Division's instrumentation and data analysis laboratories to SAO's 160 Concord Avenue facility from the HCO buildings; the annual cost per square foot at the former is \$9.37 more expensive. This accommodation was necessary to provide laboratory space at 60 Garden Street for a project supported in part by a Harvard University contract. Because of the extreme crowding at the HCO buildings, there was no other space available. Finally, SAO must provide an

instrument shelter as well as office and laboratory space for a world-renowned radio astronomer, newly elected to the National Academy of Sciences, who was recently recruited by SAO from NASA's Goddard Institute for Space Studies and Columbia University. His research depends vitally on a small radio telescope, which he brought with him from New York and which will be mounted on the roof of the HCO buildings. The funds needed for construction of the shelter are being borrowed by HCO and, according to the usual practice, are to be repaid over time by SAO through an appropriate rental increase. Because this facility will be used a small fraction of the time by Harvard students, HCO has agreed to pay 20 percent of the total costs of this installation.

If this increase is not granted, the rent will still have to be paid and the needed funds will have to be reprogrammed from base funding provided either for the non-personnel costs of SAO's research or for the computer replacement and improvement program. Neither of these budgets is large, with the rent increase amounting to about ten percent of each of these programs. Thus, lack of funding of the rent increase would have a serious and adverse effect on SAO's research activities.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Unrestricted general funds come primarily from overhead charged on contracts and grants. These funds are used to support administrative positions and some of the other administrative costs of SAO. Special Purpose funds come primarily from two sources: external users of SAO's Computer Center and the Institution's Trust funds, with the latter providing the vast majority of these funds. The former may be used for research and computer-related purposes in future years. Trust funds provide direct support for some research as well as for the Fellowship and Visiting Scientist program, which is by far the largest single special purpose program.

Restricted Funds - Restricted funds consist of restricted endowments, as well as gifts and grants from individuals, foundations or corporations which specify funds for a particular purpose.

Government Grants and Contracts - SAO receives a majority of its funding through government agency contracts and grants for research. This research is often carried out in cooperation with both governmental and academic institutions in the United States and abroad. Funding is received from Federal agencies, such as NASA, the Naval Research Laboratory and the Air Force to support specific projects in areas of SAO's expertise. In FY 1989, possible increased funding for the High Resolution Camera for the AXAF program and for a new program, the Solar Heliospheric Observatory, could result in a substantial increase in the Observatory's contracts. Both programs would be NASA-sponsored research.

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	95	4,114	2	164	--	647	--	538	9	485
FY 1988 Estimate	112	5,711	3	247	--	388	--	270	9	614
FY 1989 Estimate	129	5,879	3	211	--	331	--	400	9	578

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Tropical Research Institute (STRI), located in the Republic of Panama, serves as the Nation's leading international center devoted to research in tropical biology and conducts basic research in ecology, behavior and evolution. STRI's basic research programs are complemented by carefully selected applied studies with a common theme of "Alternatives to Destruction" (providing an environmentally and economically valid substitute for the traditional clearing of forest for conventional agriculture). In addition to STRI staff, scientists throughout the world conducting research in tropical biology use STRI facilities for their fieldwork. Under the terms of the Panama Canal Treaty of 1979, STRI has been designated the custodian of the Barro Colorado Nature Monument, a 12,000-acre tropical nature preserve (consisting of Barro Colorado Island (BCI) and five adjacent peninsulas in Gatun Lake) located in the Panama Canal. Other STRI research facilities include a marine laboratory at Naos Island (on the Pacific Ocean); a marine laboratory at Galeta Point and a field station in the San Blas Islands (both on the Atlantic Ocean); and a research library, laboratories, conference and study facilities, and administrative headquarters in Panama City. STRI scientists are also engaged in collaborative research with colleagues in other tropical countries including Malaysia, India, Madagascar, Kenya, Senegal, Costa Rica, and Venezuela.

For FY 1989, an increase of 6 workyears and \$312,000 is requested to expand STRI's small but extremely productive program in anthropology and archaeology (4 workyears and \$158,000); to provide an expanded base for the purchase of scientific equipment (\$114,000); and to reinforce STRI's structure of essential administrative support personnel (2 workyears and \$40,000). A further amount of 11 workyears and \$154,000 is required to annualize the partial-year funding of 22 positions requested in the FY 1988 budget for staffing the new Tupper Laboratory and Conference Center, and new facilities on BCI and Gamboa. These increases are offset by a reduction of \$298,000 in STRI's base funding associated with the one-time costs of equipping the Tupper Center (-\$184,000) and the BCI and Gamboa facilities (-\$114,000).

PROGRAM - The Smithsonian Tropical Research Institute, the Nation's leading international center for the advancement of basic research in tropical biology, performs at least four major functions as it strives to expand the horizons of tropical biology: 1) conducts fundamental research on the evolution and behavior of tropical plants and animals, including mankind; 2) provides major facilities for the international scientific community to study both terrestrial and marine tropical biology; 3) is deeply committed to environmental education and to conservation of tropical ecosystems; and 4) has the treaty-assigned responsibility to protect and manage the Barro Colorado Nature Monument.

Growing public and governmental concern over the impact of tropical deforestation and species extinction on the economic well-being of the United States, as well as in the tropical regions more immediately affected, has stimulated numerous public and private sector actions. Conversion of tropical forest to scrub and grassland appears to affect global, as well as regional climatic patterns, and may adversely affect the North America environment. Species loss forever eliminates potential sources of medically and commercially important natural products. The basic research conducted at STRI provides the essential framework for effective management and conservation of tropical ecosystems. Educational programs at STRI improve the transfer of this knowledge to those who will develop and implement management and conservation plans. Current research projects are summarized in an annual report and in STRI Contributions to Research, an offprint of STRI publications, which are distributed to appropriate organizations throughout Panama and the rest of the world. During FY 1987, the most significant accomplishments and major program activities have been:

Experimental Analysis of Forest Dynamics - Barro Colorado Island is unique among tropical field stations with respect to the amount and quality of logistical and technical support provided to STRI staff and distinguished visitors from numerous universities and research institutes. This makes it possible to carry out sophisticated, large scale and long-term experimental studies that would normally be impossible in a tropical forest. Such experiments are necessary to rigorously determine how environmental factors affect forest dynamics.

STRI is now in the third year of a major experimental study of how seasonal drought affects growth and reproduction of forest trees and understory plants. Two large tracts of forest have been irrigated during the annual dry season to maintain wet season soil moisture levels, and these tracts have been compared with non-irrigated controls. A major finding is that many species do not respond significantly to increased soil moisture during the dry season, contrary to expectation. This suggests that variation in day length and relative humidity, as well as soil moisture, may be playing significant roles in controlling seasonal patterns. These results will have great practical importance as they provide insight necessary for development of guidelines for tropical agroforestry schemes utilizing native tree species.

STRI scientists and collaborators are completing the fifth year of an experimental study of how seasonal and year-to-year variation in light affect growth, reproduction and distribution of forest plants. New computer image processing technology is being used to analyze the forest light environment, permitting very extensive measurements in a few hours which would previously have required several weeks. Increased leaf fall and insolation in the dry season, combined with frequent tree falls and branch falls create a forest light environment that is strikingly variable in time and space. Experimental studies in the forest and in

the BCI plant physiology laboratory demonstrate that this variation in light regime can explain much of the observed variation in growth and reproduction of canopy tree seedlings and understory species.

Biological Diversity - The origin and maintenance of the great species richness in the tropics is a fundamental research emphasis at STRI. One important, long-term component of this program is the 124 acre forest census on Barro Colorado Island. STRI researchers supervise the mapping and measurement of over a quarter of a million trees on the site every five years. Support for this critical project has been assured by funding received in the FY 1987 budget.

Excellent progress is being made on an identical research project in the more species-rich forest of Malaysia. A STRI researcher and a researcher from Harvard University are collaborating closely with their Malaysian colleagues. Long-term comparisons of the dynamics of these two forests will contribute significantly to understanding the factors responsible for variation in species richness. These studies also provide information of great practical value to foresters on the growth requirements of commercially important native species.

Biological Catastrophes - STRI's long-term basic research programs provide a context for evaluating environmental catastrophes. A major oil spill occurred in April 1986 at STRI's Galeta Marine Lab on the Atlantic coast of Panama, significantly affecting marine and intertidal communities. STRI has just signed a five-year \$3 million contract with Minerals Management Service of the Department of the Interior to investigate the impact of the oil spill on biological communities. STRI is coordinating an international team of over a dozen scientists to relate the recovery of biological communities in areas affected by the spill to natural population variation prior to the spill.

Biological Conservation - Protection and management of biological diversity is the primary goal of the emerging discipline of conservation biology. Although not called by that name, many STRI research programs directly relate to this goal. For over ten years, a STRI scientist has been capturing and banding birds in the forests of Soberania National Park adjacent to the Barro Colorado Nature Monument. As has been demonstrated on islands throughout the world, the isolation of Barro Colorado Island was followed by local extinction of many bird species. Study of birds banded in Soberania show that species that have disappeared from the Island have lower survivorship on the mainland than species that are still present on the Island. This is the first demonstration of a demographic parameter being closely linked with extinction probability on an isolated island, a result that is of major interest in conservation biology.

Molecular Evolution and Plant Physiology Initiative - Searches are in progress for three new staff scientists in the general fields of molecular evolution and plant ecophysiology. Applications from senior as well as junior scientists from around the world attest to the interest in STRI programs. Interviews of the final candidates will begin in September 1987.

Visiting Scientists - In addition to the research by permanent staff, the Smithsonian Tropical Research Institute promotes basic research in tropical biology by hosting several hundred students who study with the staff and visiting scientists from many countries. Research goals can be pursued in biologically rich environments without concern for intellectual isolation. Hundreds of scientists from major universities and research institutions all over the world ensure a

continuing infusion of new ideas leavened by the long experience in the tropics of STRI's permanent staff.

During FY 1987, a paleobotanist from Temple University continued her research on the vegetational and human history of Central Panama during the past 14,000 years. Rigorous analyses of plant remains in sedimentary deposits of known age have revealed that initial human occupation of the Isthmus of Panama, which occurred at least 13,000 years ago, took place during cooler, drier conditions than existed from 9,000 years ago to the present. She has found evidence of agriculture in Central Panama as early as 7,000 years ago (the oldest evidence of maize and squash cultivation yet found in lower Central America and South America) and evidence of extensive deforestation beginning 3,000 years ago, associated with increased agricultural activity.

Publications - At least 177 scientific papers and books were published during calendar year 1986 as a result of work at STRI. Staff and visiting scientists are currently involved in over 144 research projects which will produce at least the same number of publications.

Facilities - STRI's research facilities in Panama include the Barro Colorado Nature Monument, marine laboratories at Naos Island and Galeta Point, a small field station in the San Blas Islands, and a cloud forest station at an elevation of 6,500 feet in western Panama. STRI also operates a 63-foot research vessel for studies in both the Atlantic and Pacific Oceans. Since STRI's research programs include both comparative studies among habitats and geographic regions, and numerous carefully organized experimental studies, these facilities are also used as the home base for research conducted at numerous other sites throughout Panama.

Groundbreaking for the new Tupper Laboratory and Conference Center took place on April 3, 1987. This new facility will provide office, laboratory, and conference facilities for STRI scientific staff and visiting scientists. The laboratory will provide modern facilities similar to those at major research universities, and will support development of plant physiology and molecular evolution programs at STRI. STRI is renovating a building for use as a dorm in Gamboa, to be completed August 1987. This will facilitate research in Soberania National Park.

Plans have been completed for the new dormitory, kitchen and dining hall on Barro Colorado Island. This will provide modest living facilities for the large number of researchers who use BCI. Construction will begin with the onset of the dry season in December 1987. In addition, funding is requested as part of the Institution's FY 1989 Construction appropriation to build a new laboratory facility, a vivarium, an insectary and a growing house on BCI.

Fellowships, Conservation and Environmental Education - Because of its location in the Republic of Panama, STRI is in a unique position to play a significant role in the study and conservation of tropical environments. The goals of STRI in the area of education are two-fold: first, STRI wants to stimulate young scientists from tropical and nontropical nations; and second, STRI is committed to the conservation of tropical ecosystems and is aware that their survival depends on the combined efforts of international organizations, governments, the private sector, and people in the tropical countries themselves.

Approximately 91 young men and women (40 from Latin America) representing a dozen nations participated in STRI's academic programs in FY 1987. Also, STRI and

the University of Panama organized a graduate-level course in bryophyte ecology and systematics.

STRI's educational function in tropical biology is enhanced by its premier reference library for tropical studies. This library serves STRI's staff, visiting scientists and students from secondary schools and universities in Panama. Currently, the library has over 1,000 patrons per month.

STRI is deeply involved in conservation activities in the Republic of Panama. STRI works actively with Asociacion Nacional para la Conservacion y la Naturaleza, a newly formed local affiliate of the Nature Conservancy, in its efforts to purchase and protect endangered natural areas. STRI also provided financial and logistical support for the planning of the major new Darien National Park. Intensive studies of green iguana and paca management are providing protocols for the eventual use of these species as a standard component of Panamanian agriculture. Studies of fast-growing plantation trees and new crop plants are in progress on the mainland west of Barro Colorado Island to provide local farmers with sustained-yield agricultural techniques that eliminate the need to continually remove forest to provide new crop land.

Although the primary emphasis of STRI continues to be basic research, its understanding of tropical organisms and environments deepens and broadens over time, improving its ability to apply this knowledge to the increasingly serious environmental and economic problems confronting tropical countries. At the same time, STRI's educational programs are producing both greater interest in the application of basic knowledge to applied problems among students in the tropics, and greater expertise among these students, so that they will be better able to address such problems.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 6 workyears and \$312,000 is requested to expand STRI's research program in tropical anthropology and archaeology (4 workyears and \$158,000); to provide an expanded base for the purchase of scientific equipment (\$114,000); and to reinforce STRI's structure of essential administrative support personnel (2 workyears and \$40,000). A further amount of 11 workyears and \$154,000 is required to annualize the partial-year funding of 22 positions requested in the FY 1988 budget for staffing the new Tupper Laboratory and Conference Center, and new facilities on BCI and Gamboa. These increases are offset by a reduction of \$298,000 in STRI's base funding associated with the one-time costs of equipping the Tupper Center (-\$184,000) and the BCI and Gamboa facilities (-\$114,000).

Research in Tropical Anthropology and Archaeology (4 workyears and \$158,000)- To understand the dynamics of a tropical forest, researchers need rigorous quantitative information on past as well as present environments. Preliminary research at STRI has shown that major changes both in climate and in patterns of human activity over the past several thousand years have greatly influenced forest distribution and structure in the Republic of Panama. Scientists must also develop a better understanding of the ways in which both primitive and technologically advanced cultures perceive and utilize tropical habitats. This will contribute to the development of more effective conservation and management schemes.

The requested increase would allow STRI to hire two new staff scientists (2 workyears and \$100,000) and support technicians for each scientist (2 workyears and \$38,000). (It is anticipated that a third staff scientist position in

Anthropology/Archaeology will be requested in FY 1990.) One of the positions would be filled by a paleobotanist with expertise in palynology and in the new techniques of phytolith analysis. STRI researchers have discovered sedimentary deposits throughout Panama spanning many thousands of years. These deposits contain carbon, which can be analyzed using carbon dating analysis to provide the exact age of each layer, and pollen and phytoliths, which provide a record of past vegetation structure and species composition. The appearance and disappearance of indicator species over time (e.g., corn, grassland versus forest species) provide a record of past climates and of changing agricultural activities.

The second position would require the capabilities of a field-oriented anthropologist with expertise in the sociology of cultures indigenous to tropical forests. The researcher would, to a large extent, be pioneering new conceptual frameworks and analytical techniques, significantly advancing the field of ecological anthropology. This scientist would conduct analyses of how such groups use forest plants and animals, how their agricultural and hunting-gathering practices affect forest dynamics, and how these practices are affected by increasing contacts with non-indigenous cultures. These studies are of fundamental interest as they provide quantitative data on the relationship between cultural traditions and forest ecology and new perspectives on tropical forest resource management.

STRI will seek candidates in social anthropology who have the breadth, theoretical expertise and creativity necessary to explore the complex relationships among human behavior and perception, cultural traditions, social and economic organization and the spatial-temporal structure of the environment. This research will involve the construction of general models for the ways in which humans perceive, react to and modify the habitats in which they live, and the testing of these models with existing data on new and old world indigenous tribal cultures and the non-indigenous cultures that replace them. There are few precedents for such a position.

A sum of \$20,000 is also requested to provide research, travel and library service support for these two new staff positions.

Scientific Equipment Acquisition and Replacement Program (\$114,000) - The condition of research equipment at the Institution's science research bureaus has been a source of concern for a number of years. Many pieces of research equipment have become outmoded by recent technological developments. The productivity of Smithsonian research staff, especially new members trained in the use of modern equipment, has been severely impaired by the condition of this equipment. Prior to FY 1984, equipment needs, particularly major items, were addressed only on an ad hoc basis. Beginning in FY 1984, the Institution began to address these problems through a systematic review of inventoried equipment in each of the science bureaus. The results of this systematic review dramatically outlined the poor state of the Institution's research equipment, and the need to develop a rigorous cyclical program for replacement and upgrading. Recognizing the age of the many pieces of equipment, the Institution perceived a need to develop a cyclical schedule to enhance the base funding of these bureaus for equipment.

For STRI, the necessity for establishing an adequate funding base for a long-term cyclical program of scientific equipment replacement and upgrading is underscored by its geographical location and climatic conditions. STRI's relatively isolated location combined with the harsh tropical climate require more frequent replacement of certain equipment and the need for back-up systems to ensure

continuous operation. STRI's current base of \$100,000, established in FY 1986, cannot fully support the scheduled replacement and upgrading of scientific equipment as required under the cyclical program. For FY 1989, an increase of \$114,000 is requested to establish an expanded base of \$214,000 for this program. (Increased funding for this program is offset by a reduction in STRI's base funding associated with one-time equipping costs for the new BCI and Gamboa facilities. It is anticipated that additional funding for this program will be requested in FY 1990, offset by a reduction in base funding associated with the second portion of one-time equipping costs for the Tupper Center.)

Staffing for Administrative Support (2 workyears and \$40,000) - The growing administrative responsibility resulting from increased numbers of visiting researchers and the general growth of research programs at STRI have placed a heavy burden on the existing administrative support staff at STRI. Because of STRI's remote location, it must be more self-reliant with respect to administrative support than Smithsonian bureaus located in the United States. Research at STRI is becoming more experimental and technically complex, further adding to the demand placed on support staff. Two major multi-year grants to STRI from non-Smithsonian sources (the W. Alton Jones Foundation grant for agro-forestry research and the United States Department of the Interior grant for the oil spill study) have greatly increased the workload of the Accounting department. Thus, steps must be taken to catch up in administrative personnel to properly service the administrative needs of the research programs. For FY 1989, funding is requested to hire an accounting technician and a secretary (2 workyears and \$40,000).

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are derived from a variety of sources including receipts and collections from users of Barro Colorado Nature Monument facilities (20 U.S.C. 79b (d)) and annual allotments. Such funds are used to support, in part, the salaries and related costs of the fellowship program, the senior sabbatical program, insurance, supplies, and a long-term collaborative research program with the Forest Research Institute in Malaysia. As a result of the United States Ambassador's directive banning the use of the Panama railroad for official purposes, funding was provided at the end of FY 1986 for the purchase of a high speed vessel to transport personnel to Barro Colorado Island; this boat should be in service by November 1987. Funds also are used to support a short-term fellowship program in tropical biology; visiting scientists and students; field research; seminars and lectures; environmental, conservation and education activities in Panama; and to defray expenses at international scientific colloquia and ceremonial occasions.

Restricted Funds - Funds are in the form of restricted endowments which specify the use of the donation or bequest and gifts and grants from individuals, foundations, organizations, or corporations for specific purposes. These are used to support scientific research related to the biological, ecological and behavioral processes on which tropical ecosystems are organized; research related to geophysical events; publication and distribution of research results; and studies relating to endangered tropical environments.

Continuing support from the Exxon Corporation will be used to provide short-term tropical biology fellowships and assistance to 30 students from developing Latin American countries and a grant from Noyes Foundation will support long-term fellowships for students from the developing world.

A grant awarded by the W. Alton Jones Foundation, Inc., supports research on the management of the green iguana for human consumption and the domestication of the paca as a food source. These projects are designed to develop alternatives to the destruction of tropical forests for conventional agriculture (particularly extensive cattle rearings) and have been conducted over a five-year period in the vicinity of the Barro Colorado Nature Monument; the project will end during FY 1988, unless additional funding can be raised.

Government Grants and Contracts - A \$3 million contract was signed with the Minerals Management Service of the United States Department of the Interior in June 1987 to permit a five-year study of the catastrophic oil spill at the Galeta Field Station.

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	40	2,088	1	86	--	107	--	17	--	400
FY 1988 Estimate	28	1,376	2	99	--	102	--	35	--	405
FY 1989 Estimate	28	1,376	2	100	--	102	--	--	--	351

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Environmental Research Center (SERC) performs basic scientific research on coastal land/water systems. SERC currently occupies 20,000 square feet of laboratory, office, educational, and support buildings and 2,600 acres of land on a tidal river system. The interdisciplinary staff, visiting scientists, and students study how land use, air quality, and weather variations affect (a) the movement of nutrients, eroded soil, and other materials through the system; (b) the dynamics of plant and animal populations; and (c) the overall health of the system. No increase is requested for FY 1989.

PROGRAM - SERC research has the goal of attaining a better overall understanding of how coastal land/water environmental systems function. Research staff address a wide variety of ecological questions while conducting a long-term interdisciplinary study of a tidal subestuary of Chesapeake Bay (Rhode River) and its watershed. This watershed contains a mosaic of upland and floodplain forests, marshlands, cropland, pasture, abandoned fields, and residential areas typical of the mid-Atlantic Coastal Plain. This land/water system is used as a testing ground for theories that have broad applicability and for environmentally relevant issues. The Center has already studied such problems as (a) effects of herbicides on plants in Chesapeake Bay, (b) acid rain effects upon deciduous forest and fish reproduction, and (c) the role of riparian forests in alleviating pollution from agriculture. The similarity of the Rhode River system is directly tested by comparative studies of other systems.

Research Results - Streamside or riparian forests play an important role in intercepting pollutants from developed or agricultural uplands before they enter streams on the watersheds of the Chesapeake. SERC has now established detailed hydrologic budgets for these forests. Over a two-year study period 62 percent of the rainwater and cropland runoff which entered the riparian forest was evaporated or transpired. This averaged eight centimeters more per year than the total precipitation. This study also found that over 90 percent of the acidity in cropland runoff was neutralized within the riparian forest. Partial funding of

this work was undertaken with support of the Institution's International Environmental Science Program.

Carbon dioxide concentrations in the Earth's atmosphere have recently been increasing (approximately one-half percent per year) and are anticipated to double over current levels within the next century. SERC scientists are testing the effects of a doubling of the carbon dioxide concentrations on Chesapeake Bay tidal marsh plant communities. Long-term effects upon competition between species with differing ability to utilize the increased concentrations of carbon dioxide are anticipated. Thus, plants such as sedges may be able to displace grasses such as Spartina patens, altering the overall character of the marsh plant communities. In addition to its impact upon photosynthetic rates, elevated carbon dioxide was predicted to cause the plants to require less water and to, therefore, reduce their level of salt stress. This prediction has already been confirmed in field populations. Such secondary effects of elevated carbon dioxide may ultimately bring about unanticipated ecological effects. For this reason, direct experimental studies of ecological effects at the plant community or ecosystem level are necessary if we are to anticipate long-term effects of the increasing concentrations of atmospheric carbon dioxide. This project is partially funded by the U.S. Department of Energy.

For several years, studies of blue crab ecology have focused upon their behavior and population dynamics in the Rhode River. Abundances, size-frequency distributions, sexual composition, and molt-stage composition were studied. New crab recruits entered the subestuary in late autumn and spring and grew rapidly to 70 to over 100 millimeters in their first summer; by the second year they reached mature sizes of 120 to 170 millimeters. Sixty percent of crabs in the river basin were males; and after maturation and copulation in late summer to early autumn, mature females left the subestuary. Crabs partitioned habitats within the Rhode River subestuary by size, sex, and molt stage. Polymodal size structures were similar throughout the river basin, but increased percentages of males were found at the head of the river. Predominantly (90 percent) medium-sized (80 to 120 millimeters) males utilized the tidal creek as a molting habitat. Most crabs moving upstream were in premolt, whereas most crabs moving downstream were significantly larger and in postmolt, so that about 70 percent of crabs in the creek were near ecdysis. Males and females exhibited significantly lower, but still appreciable (about 25 percent) molting activity throughout the river basin. These data provide one of the best documented cases of habitat partitioning by size, sex, and molt stage in crustaceans.

Blue crabs are major predators on Chesapeake Bay benthic animals such as soft-shelled clams. How do adult soft-shelled clams persist at low densities in Chesapeake Bay sandy habitats despite intense predation by blue crabs? This persistence may be a consequence of variation in blue crab foraging rates as a function of clam density and sediment composition. In laboratory aquaria, the functional responses (prey consumption per predator as a function of prey density) were studied of large blue crabs to six densities of adult soft-shelled clams buried at natural depths in two sediment types (mud and sand). Functional responses in sand and mud were differentiated statistically and modeled. Crab predation rates were significantly higher in mud than sand, and functional responses differed significantly between these two substrata. Blue crabs displayed type III (sigmoid) density-dependent functional responses in sand and type II (decelerating rise to an upper asymptote) inversely density-dependent responses in mud. Risk of mortality for clams decreased sharply in sand at low densities, which

are equivalent to those observed in the field. These observations (1) suggest that variable blue crab functional responses result in microhabitat-specific mortality rates of benthic prey, and (2) indicate that functional response can differ significantly according to the physical properties of topographically simple habitats.

Ants are well known to be important and abundant links in the terrestrial food web. A study of the ant populations in the litter and soil of a mature forest on the Rhode River watershed in Maryland found 22 species to be present. The ten most abundant species accounted for more than 95 percent of the individuals collected. The density of ants per unit of surface area was more than three times as high in the upper ten centimeters of soil as in the overlying litter. Seasonal differences in ant abundance and community composition were significantly correlated with surface temperature and were largely independent of substrate moisture content and standing crop of leaf litter. Ant density and biomass were high, rivaling previous values reported from tropical forest ecosystems.

Educational Activities - SERC provides a broad range of educational activities, including teacher-led field trips, self-guided nature trails, and guided tours in which groups of students and the general public observe firsthand a variety of natural habitats. A work/learn program enables students to work with scientists, both in the field and in the laboratory. Predoctoral, postdoctoral, and sabbatical programs for professionals at all levels enable visiting researchers to carry out collaborative or independent research at SERC. The results of SERC's research are disseminated through the publication of findings in scientific journals, the presentation of research findings at national and international scientific meetings and seminars, the training of scientists, and public education activities.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are provided by allotments and proceeds from the sale of educational brochures and materials. Uses include support of special events, work/learn and fellowship programs, and the salary costs of a docent coordinator and a part-time public program director.

Restricted Funds - These are provided through donations, bequests, and foundation grants that are designated for specific subjects of investigation. For SERC, these include a grant from the World Wildlife Fund to support investigations of the effects of land use changes in the Yucatan Peninsula upon migratory bird populations which nest in the Chesapeake region and winter in Mexico.

Government Grants and Contracts - These funds are provided by various Federal and State agencies for special projects which can be conducted at SERC due to the expertise of the staff and the unique physical site characteristics. Grants from the Chesapeake Research Consortium and the U.S. Department of Energy are expected to total approximately \$550,000 in FY 1988 and \$600,000 in FY 1989.

NATIONAL ZOOLOGICAL PARK

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	321	12,223	1	. 135	2	225	1	250	--	90
FY 1988 Estimate	332	13,176	1	132	3	450	1	923	--	96
FY 1989 Estimate	342	13,703	1	134	3	406	1	872	--	59

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - In its 1889 charter, the mission of the National Zoological Park was defined as "the advancement of science and the instruction and recreation of the people." Today these goals are accomplished through programs that make the National Zoological Park a leading international center for animal exhibition; biological and veterinary research; conservation; and public education in conservation and in the humane care of animals. The Zoo houses its public collection on a 163-acre site at Rock Creek Park in Washington, D.C., and maintains a major conservation, animal breeding and research center on 3,150 acres in Front Royal, Virginia. Through its programs in research, conservation, animal health and education, the Zoo serves the public and specialized audiences in promoting understanding of animal adaptations and evolution, and the interaction of wildlife with the environment. For FY 1989, an increase of 10 workyears and \$527,000 is requested to support existing facilities at the Zoo (8 workyears and \$327,000) and to support the molecular systematics and evolution program at the National Zoological Park (2 workyears and \$200,000).

PROGRAM - At the Rock Creek site, the National Zoological Park (NZP) is responsible for the maintenance and welfare of approximately 3,000 animals comprising over 450 species. The species are chosen primarily for their interest to the public and their contribution to research and conservation. About 700 animals, representing 43 species, housed at the Conservation and Research Center (CRC) at Front Royal have been selected, due to their precarious status in the wild, to form the basis for long-term breeding and research potential.

In addition to its traditional animal management practices, the Zoo plays a major role in developing new techniques for long-term sperm and embryo storage and embryo transplantation. These techniques probably will play a crucial part in future conservation objectives. Many species are endangered due to man-made disturbances to their natural habitats, which is particularly true in the tropics. For this reason, the Zoo has an energetic program of conservation research in the natural habitats of endangered species and is conducting pioneering studies in the

reintroduction of animals bred in zoos to their native habitat. The Zoo is developing programs on the role both the public and zoos can play in animal conservation. The major programs of the National Zoo are animal exhibition; animal management; animal conservation and propagation; research; and public education information.

Animal Exhibition - Animals are exhibited primarily to excite the Zoo visitor about biology and the natural world. The National Zoo is becoming a BioPark by shedding traditional distinctions between plants and animals, aquatic and terrestrial life, vertebrates and invertebrates, and even science and art. Ecological holism requires that the separation of aquariums, botanical gardens, natural history and art museums, and zoos be reduced considerably. The resulting BioPark will emphasize the inter-relationships between plants and animals, living and extinct organisms, water and land, form and function. The influence of man on nature, including domestication, agriculture, hunting, art and environmental impact will be featured.

The Invertebrate Exhibit at the Zoo, opened in 1987, embodies the BioPark concept. Here, the animals without backbones, from sponges to octopuses that make up 98 percent of the animal kingdom are shown in authentic and elegant settings. A leaf cutter ant colony, giant octopus, and cuttlefish remind us of analogues to the sociality, intelligence and communication of vertebrates. The far greater antiquity and abundance of invertebrates surprises those who revere the rhinoceros. The ubiquity of invertebrates as subjects of human art and gastronomy is a provoking sidebar, and the final theme in this new exhibit combines flowers, bees and Shakespeare.

A new exhibit for gibbons, located on a wooded ridge in Rock Creek, nears completion. This will form an appropriate stage for their spectacular locomotion and territorial calling. The graphics and plantings will be restful, understated and organic reminders of the Asian origins of these very endangered forest apes.

Renovation of the waterfowl wetlands in front of the Bird House began in July. It is a naturalistic, contemplative setting that will in spring come alive with the elaborate courtship rituals of a wide variety of ducks, geese and swans.

Of particular note, is the emergence of a conceptual plan for the Amazonia Aquatic Exhibit, the first phase of the new aquatics complex. The Amazon is the most diverse freshwater habitat in the world in species numbers, hydrology and ecology. It is almost totally interlinked with the rain forests through which it flows. A very substantial part of the foods for the extraordinary array of Amazonia fishes comes directly from the surrounding, overhanging and enclosed forest. Thus, an Amazon exhibit is inevitably also a forest exhibit and that means it draws from the flora and fauna of the largest continuous area of forest in the entire world and an unparalleled diversity of life.

There is another input into this exhibit that will make the design process seminal, and the final product unique; that is, the unrivaled expertise of the Smithsonian in the field of tropical biology. The Institution encompasses the world's premier tropical research institute, the Smithsonian Tropical Research Institute, a large cadre of tropical biologists at the National Museum of Natural History and the National Zoo. No other biological institution anywhere, and certainly no other zoo, aquarium or botanical garden, has ever been able to call upon such a wealth of talent.

The exhibit, sited at the former polar bear enclosure, will display a wide variety of aquatic animals concentrating on fishes but including seldom seen amphibians, reptiles, birds and mammals with above- and underwater viewing. It will be set in a tropical rain forest which will illustrate the predominant features of tropical biology and emphasize complexity, specialization, and interactions. Among the aquatic animals currently under consideration for the aquatic component are giant otters, snakebirds, freshwater sharks and hundreds of species of Amazon fishes.

Orangutan, giraffe, saurus cranes, small-clawed otters, golden-headed tamarins and cuttlefish were among the nearly 1,000 births and hatchings that in 1987 bolstered stocks of jeopardized species and delighted visitors. An infant giant panda riveted the American public for 72 hours before its sad and sudden death; plans are already afoot to further improve the panda's breeding potential. The likelihood of a gorilla birth at NZP was enhanced by the successful formation of a naturalistic group. Two young, female, great one-horned rhinoceros were presented to the National Zoo by the King of Nepal as a symbol of a long-standing successful collaboration between the Smithsonian and Nepal to save the Chitwan National Park. It is the Institution's hope that these animals will eventually form the core of a breeding program for this rare and beautiful species.

Camels, Mississippi river fish, free-ranging golden lion tamarins, beavers, star-nosed moles, and pheasant pigeons, among others, were added to the exhibit program.

Animal Management - Of prime importance is the health and well-being of the animals under the Zoo's care. The Zoo attempts to provide the animals with natural and congenial conditions which contribute to the overall state of health and a general absence of stress. In addition, the National Zoo provides the most advanced techniques in health care, preventive medicine, emergency treatment, surgery, dentistry, and neonatal medicine. As part of the medical program, the Zoo has a pathology staff that provides in-house diagnostic support for the collection and engages in research related to disease prevention. The medical care is reinforced by a scientifically based nutrition program and the highest standard of food preparation. Comprehensive medical and general records, the majority of which are automated, are maintained on all animals. These records are a major tool in maintaining the Zoo's health standards, developing breeding programs, and advancing veterinary research.

The medical case load is now about 3,000 cases per year with approximately 700 hospitalized patients. The new Conservation and Research Center hospital is now functioning. Animals have been quarantined at this facility and major surgical procedures are performed in the surgery suite. The associated laboratories are being utilized for urinary hormone analysis, semen freezing, antibiotic assays, and clinical pathological studies.

The new hospital at Rock Creek, to enhance medical and surgical care plus providing necessary laboratories for applied clinical and reproductive research, is scheduled to open February 1988. Additional funding will be required to equip this facility so the NZP will have the state-of-the-art facilities for its animals.

During 1987, the Zoo made major advances in the field of reproductive physiology and endocrinology. The year began by the establishment of the Endocrinology

Research Laboratory in the new veterinary hospital complex at the Conservation and Research Center. This laboratory's research is oriented towards monitoring hormonal metabolites in voided urine, an ideal non-invasive approach to studying endocrinology of wildlife species in zoos. This technique has already been successfully used to diagnose pregnancy and length of the reproductive cycle in Eld's deer and the Przewalski horse and studies are in progress involving Pere David's deer, muntjac and golden lion tamarins.

Various Department of Animal Health staff members served as reproductive consultants on the black-footed ferret propagation program coordinated by the state of Wyoming. The Zoo also served a research role by studying the efficiency of artificial insemination in Mustilidae, using the domestic ferret as a model for its black-footed relatives.

New techniques in reproductive physiology have resulted in the birth of more than 100 young of domestic animals used as models for rare and endangered species. Of particular significance was the Reproductive Program involving in vitro fertilization in which eggs were laparoscopically recovered from domestic female cats and mixed with sperm in the laboratory to produce embryos. These embryos were transferred to the reproductive tract of four surrogate mother cats resulting in three pregnancies and the birth of healthy kittens. The technology associated with these, the first ever "test tube carnivores," will have applications to many endangered carnivores. Embryo transfer studies are ongoing with scimitar-horned oryx and bongo at the Conservation and Research Center and collaborating zoos in the United States.

Animal Conservation and Propagation - The Conservation and Research Center continues to play a leading role in research and breeding programs for rare and endangered species. The Center's facilities provide a unique environment for breeding selected species such as Przewalski horses, Burmese brow-antlered and Pere David's deer, maned wolves, clouded leopards, lesser pandas, Matschie's tree kangaroos, Guam rails, Micronesian kingfishers, red-crowned and white-naped cranes, and several others. Most of these breeding programs entail considerable cooperation with agencies, institutions, and nations. The Zoo will continue its active leadership role in a variety of national cooperative breeding programs, such as those for the golden-lion tamarin, gorilla, orangutan, small-clawed otter, and Bali mynah.

The Center is also an important training ground for the wildlife management and training curriculum, which is taught to nationals of developing nations. Nearly 200 students from South America, Africa, and Asia have participated in this unique course at Front Royal, and a similar number of students have attended the course in Sri Lanka, Peru, Venezuela, and other third world locales. In 1987 the course was given for the first time in the People's Republic of China. In addition, a new zoo animal management training course was given by zoo personnel in Thailand and Malaysia. This course provides much-needed fundamental training in zoo animal management to mid-level zoo personnel in developing nations. The zoo will continue its highly successful ongoing training programs for United States students in the areas of veterinary medicine, pathology, animal behavior, and animal management. The growing demand for all of these programs testifies to the dimension of the need and the uniqueness of the National Zoo's training curricula.

The National Zoo is actively promoting conservation in the wild. In 1986 and 1987 the National Zoo's research team in Nepal (the Smithsonian Institution-Nepal

Terai Ecology Project--SINTEP) assisted in the translocation of 13 one-horned Asian rhinoceros from Royal Chitwan National Park to Royal Bardia Wildlife Reserve in Nepal. Other reintroduction programs for Eld's deer, Guam rails, and Bali mynahs are underway or are to be carried out in the near future.

Animal propagation requires a high degree of cooperation between zoos. Animals must be transferred between zoos for demographic and genetic management, and a number of animals have been delivered to foreign zoos. The zoo continues to explore opportunities to place rare and important species in zoos outside the United States to promote reproduction, public education and zoological interest. For example, the zoo will transfer a pair of Eld's deer to Thailand in late 1987 to commemorate the 60th birthday of the King of Thailand. This gesture is also relevant to breeding and reintroduction programs in which the NZP scientists are assisting for this endangered species. Five endangered species are being managed on a national or international scale by Zoo staff.

The Conservation and Research Center will become the recipient of a breeding group of black-footed ferrets in 1988. This severely endangered species of the Great Plains has been the focus of intensive conservation efforts by Federal agencies. The Zoo's breeding center was considered by experts to be the most competent facility to deal with the propagation and research challenges of this species, but supplemental funding will be required to support this crucial project.

Research - The success of the NZP programs in conservation and propagation depends largely upon the Zoo's ongoing research. The reintroduction of the golden lion tamarins to the wild would not have been possible without sophisticated and painstaking research. With little prior knowledge, Zoo researchers had to study in great detail the structure of the social and family life of tamarins before they could successfully breed them and, ultimately, re-create natural groups of animals capable of surviving in the forests of Brazil. Zoo studies are now emphasizing a variety of approaches to improve our understanding of the ecology of the golden lion tamarin for application to its conservation. Studies of the energetics of golden lion tamarins will include an investigation of the species' temperature control mechanisms and the role of the nest hole (for sleeping) in maintaining body temperature; preliminary results suggest that these animals may enter a torpid-like state when they sleep at night, with their temperature dropping to near ambient. Additionally, detailed studies of the diets and feeding behavior of tamarins in the wild are being conducted to determine the sources, digestibility, and caloric content of their major foods to understand better how they obtain their energy requirements.

The National Zoological Park's field ecology program on golden lion tamarins in the Poco das Antas Reserve (Brazil) is now focusing on in-depth examination of the mating system and social organization of this species so that scientists can predict how and why the future population might expand. NZP researchers have found an extremely variable mating system, with different groups exhibiting monogamy, polyandry, and even polygamy, although the vast majority are strictly monogamous; this degree of variability is exceedingly unusual among mammals. The Zoo is currently correlating the type of mating system in each group with each individual's social, sexual, and parental care behavior, in order to determine the optimal strategy for individual reproductive success. Finally, NZP has commenced studies of the density and distribution of other animals in preferred habitat for golden lion tamarins to determine whether an independent measure of habitat quality

can be developed and applied to the selection of sites for the release of zoo-born golden lion tamarins.

The golden-headed lion tamarins, a new acquisition in 1986, are reproducing well, with three surviving litters in the first year. Once long-term propagation is assured for this species, the Zoo hopes to start a research and release program in Brazil comparable to what has been accomplished with the golden lion tamarins.

In general, research at the Zoo concentrates on understanding the factors that influence the biology and behavior of both species and individuals. One major area of interest is in growth; studies focus on the natural patterns of development of different species in order to determine the ontogenetic and evolutionary basis for species differences in adult behavior. For example, studies of how certain bird species learn to find and feed on the correct foods illuminate how inborn behavioral tendencies are channeled into the appropriate adult response. One application of these studies of learning is the training of zoo adults and young for survival in the wild.

A major focus of research at the National Zoo is on genetic studies. Various studies being conducted, in conjunction with other zoos around the world and with the National Cancer Institute, are expected to contribute to the long-term viability of zoo populations of critically endangered species. Automated demographic models and long-term breeding plans are being developed for zoo populations of tigers, Asiatic lions, and golden lion tamarins. Efforts to determine the pedigrees of several hundred zoo bred endangered Bali mynahs were started prior to establishing discussions concerning the potential for a reintroduction program for this species in Bali, Indonesia.

New biochemical studies resulted in the finding that cheetahs in zoos show little genetic variation. This could be one explanation for their poor breeding performance in captivity. NZP has also found that the three forms of lion tamarins, although very different in appearance, are almost indistinguishable biochemically. Additionally this study showed that the zoo population of golden lion tamarins is more genetically variable than the wild population. Future studies of the tamarins will focus on the development of more rigorous methods for distinguishing the three types of lion tamarins as well as different lineages within the golden lion tamarin group.

Several new research projects were started on a species completely new to the Zoo's collection. In collaboration with the Duke University Primate Center, the Zoo successfully reproduced, for the first time, western tarsiers acquired from Malaysia. Tarsiers have been seldom maintained or exhibited in zoos due to their delicate and nocturnal nature. The Zoo is currently cooperating with several other zoos and governmental agencies to breed the Guam rail and Micronesian kingfisher. Although both of these species are now extinct in the wild, the animal breeding programs will eventually enable them to be reintroduced into native habitat on Guam. Similarly, the Zoo is now cooperating with other zoos and wildlife agencies to develop propagation techniques for Hawaii's endangered forest birds by using several native, non-endangered species as research surrogates. One such species, the amakihi, will be captured and brought to the Conservation and Research Center for propagation research in the fall of 1987; the program will be expanded to two other species in 1988.

Public Education and Information - The Zoo seeks to inform and educate the large and diverse audience it serves through a wide range of creative programs and materials. The National Zoo News, a newspaper for area teachers, keeps them informed about the Zoo and its educational programs, ranging from multi-visit activity based programs to single visit tours. "A Closer Look," a special Zoo program for city elementary teachers and their students marked its tenth year in 1987. The program begins with a summer workshop for teachers and is followed by a six week course of study for them and their students during the school year at the Zoo. Over 3,600 children have now graduated from the program. In May 1987 teachers from the past 10 years met at the Zoo to celebrate and share their experiences in the program.

In conjunction with its support society--the Friends of the National Zoo--the Zoo offers classes to adults in conservation, animal behavior and exotic animal medicine. Participants completing six courses are awarded a certificate in wildlife studies. To date several hundred people have received certificates and many more have enrolled in the classes.

In all its programs the Zoo is placing more emphasis on conservation education. ZooArk, a temporary exhibit on zoos and world-wide conservation programs, was developed and installed in six Zoo buildings. The exhibit, aimed at family audiences, included interactive elements such as computer games and rotating panels. Smithsonian Institution Traveling Exhibition Service is planning to circulate the exhibit to other zoos and museums. In addition, new conservation programs are being planned for elementary and junior high school students, and conservation themes are being included in interpretive materials for all new animal exhibits.

People across the United States are able to share in the benefits provided by the Zoo through print, television, symposia and film stories. Nationally televised programs, such as the August 1987 Audubon Society special "On the Edge of Extinction," have underscored the Zoo's role in preserving endangered species. Other events, like the Sunset Serenades series, featuring folk, jazz and blues concerts, reach out to new audiences to bring them to the Park in the under-utilized early evening hours during the summer months. The "Symposia for the Public" series introduces serious biological topics to the public through illustrated lectures and discussions. The sixth symposium, held in October 1986, provided a behind-the-scenes look at scientific studies conducted at the Zoo. Proceedings of several symposia have now been published and have been received well by the public.

Additional public lectures held throughout the year focus on a variety of wildlife and environmental topics. The most recent lecture emphasized the critical role of invertebrate animals in maintaining the global habitat.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 10 workyears and \$527,000 is requested to support existing facilities at the Zoo (8 workyears and \$327,000) and to support the molecular systematics and evolution program at the National Zoological Park (2 workyears and \$200,000).

Support of Existing Facilities (8 workyears and \$327,000) - The Zoo continues to have a need for additional staff positions in order to support ongoing programs; provide keeper and support staff for newly constructed facilities; and provide for the safety and security of the visitors, staff and live collection. For FY 1989, the Zoo is requesting 8 additional workyears and \$327,000 for one curatorial

position, three animal keepers, one medical technician, one trades and craft position, one police officer, and one general maintenance worker as well as support funds to purchase supplies for the new hospital and invertebrate exhibit.

One curatorial position (\$42,000) and two animal keeper positions (\$54,000) are needed to support the expanding animal collection as a result of the new aquatic exhibits. In May 1987 the Zoo opened its totally new Invertebrate Exhibit in the basement of the Reptile House. In FY 1989 the Zoo will begin construction on the first phase of the Amazonia Exhibit, with exhibit space scheduled for construction the following year. The three new positions will supplement current animal care staff and provide for a core of keepers and curatorial effort to assist in developing animal husbandry techniques for a range of new animals at NZP and for operational planning of the actual Aquatic Amazonia Exhibit. The remaining animal keeper position (\$27,000) will provide the additional care necessitated by new and updated exhibitry. The medical technician (\$29,000) will be assigned to the new Rock Creek veterinary hospital. This state-of-the-art facility is scheduled to be operational in February 1988.

The trades and craft position (\$32,000) and the general maintenance position (\$19,000) are needed to support the maintenance department at the Zoo. The addition of new facilities and scheduled construction over the next 5-year planning period require additional maintenance support staff to provide for the general upkeep of the facilities and grounds. The additional police officer (\$24,000) will be used to provide security for the newly constructed facilities at the Zoo. The additional \$100,000 will be used in part by the animal department to purchase new and replacement supplies and equipment for the Invertebrate Exhibit and to purchase medical and pathology supplies for the new hospital.

Molecular Systematics and Evolution Program (2 workyears and \$200,000) - In FY 1988, with funds made available as a result of the closure of Smithsonian Environmental Research Center, the Zoo will be able to establish programs for molecular genetics and the genetic management of rare and endangered species. The Zoo faces the challenge of conserving breeding populations of rare and endangered species. A primary goal is to maintain sufficient genetic diversity within biological populations of captive species and subspecies or distinct geographic groups to prevent inbreeding depression. Zoo staff also need, for example, to measure genetic diversity and to establish breeding pedigrees. This year's request for two additional positions and \$200,000 will complete the staffing requirements and go a long way to providing the necessary supplies and equipment to operate a successful program. The Zoo plans to hire a laboratory supervisor (\$59,000) and a second laboratory technician (\$29,000) with the funds provided. The additional \$112,000 will be used to support the purchase of lab supplies and equipment for the day-to-day operation of the program.

NONAPPROPRIATED SOURCES OF FUNDING:

The New Opportunities in Animal Health Sciences Center was established to build upon the present nascent effort at the Zoo to undertake fundamental investigations in biology and medicine in relationship to exotic animals. Tremendous advances have been made over the last two decades in veterinary medicine, reproductive physiology and biotechnology which are now only being applied to animals in a zoo setting. These monies will be utilized to capitalize and expand on these opportunities by hiring new staff, and purchasing necessary equipment and supplies. New research programs hold hope for improving the quality of care of exotic animals

both in zoos and in the wild, and also for increasing species survival through new reproductive techniques.

SMITHSONIAN INSTITUTION ARCHIVES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	15	562	6	192	--	--	--	--	--	--
FY 1988 Estimate	15	579	6	255	--	--	--	--	--	--
FY 1989 Estimate	15	630	6	215	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Archives (SIA) is responsible for preserving the Institution's record and for documenting its history. In carrying out this responsibility the Archives staff surveys records files and determines which should be saved or discarded; accessions useful reference files into the central repository; preserves and administers documents; and performs research for the benefit of Smithsonian staff, outside scholars, and the public.

A program increase of \$51,000 is requested in FY 1989 to fund the cost of providing approximately 4,000 square feet of commercial space for archives storage within the Washington metropolitan area, to accommodate about 12,000 cubic feet of records, and thus satisfy storage needs for present overflow and projected accessions for the next several years.

PROGRAM - The Smithsonian Archives consists of five program areas: records management, acquisition of documents, research, archives management, and outreach.

Records Management - The Archives staff surveys records files in all bureaus and offices of the Institution, appraises their future reference value, and schedules documents for disposal or for transfer and accession into the Archives.

Acquisition of Documentation - Professional papers of Smithsonian research staff and oral history interviews are accessioned into the Archives to complement official records in documenting the history of the Institution. The records and papers are arranged, described, and preserved for indefinite continuing use into the future, and their availability is made known through catalogues and other finding aids.

Research - The Archives staff provides research and reference services on historical topics related to Smithsonian events and development for other Smithsonian staff, outside scholars, and the public.

Archives Management - Archival management involves arrangement, preservation, and description of material accessioned into the Archives, and documentation of its provenance, legal and access status, processing and reference use, and sharing of knowledge and experience of archives management with others in and outside of the Institution.

Outreach - The outreach program includes publication and dissemination of information about holdings to the Institution, the worldwide scholarly community, and the general public; provides advice and assistance to other museums and organizations about effective archival and records management practices; and implements new procedures and developments discovered from discussion in professional meetings and articles in professional journals.

Staff and Facilities - The Archives program is staffed by historians, archivists, technicians and clerical personnel. The Archives occupies space in the Arts and Industries Building, where the permanent collections are kept and administered for the convenience of staff, scholars, and the public. The Archives also manages a modest records center at 1111 North Capitol Street.

Program Accomplishments - SIA conducted surveys of records in the Freer Gallery of Art and the recently closed Rockville facility of the Smithsonian Environmental Research Center. Accessions in FY 1986 totaled 646 cubic feet, and 866 cubic feet were added in the first three quarters of FY 1987, bringing the total holdings to 13,173 cubic feet. There were 1,520 reference inquiries in FY 1986, and 1,150 through June 1987. Items provided for examination by researchers totaled nearly 5,500 in FY 1986 and nearly 4,000 through June 1987. FY 1986 copying for researchers came to 25,000 pages, and through June 1987 the total is more than 20,000 pages.

EXPLANATION OF PROGRAM INCREASE:

Rental Space for Archives (\$51,000) - The Smithsonian Archives is requesting an amount of \$51,000 in FY 1989 to rent approximately 4,000 square feet of commercial space for archives storage within the Washington metropolitan area, to accommodate about 12,000 cubic feet of records and thus satisfy storage needs for present overflow and projected accessions for the next several years.

The Archives is composed mostly of paper documents, however new accessions include photographic, magnetic tape, and other modern media materials. The growth and diversity of the archives are directly attributable to the records produced yearly from Institutional activities. Annual growth and diversification of the Archives must mirror that of the Institution if effective archival services are to be maintained.

Archives on hand presently exceed shelf capacity by approximately 2,000 cubic feet. Records exceeding the capacity of the stack shelving area are temporarily stored under very inadequate conditions on aisle floors and around the balcony of the A&I Building. Annual growth is projected at a rate of about 1,000 cubic feet, therefore an estimated 8,000 to 12,000 additional cubic feet of space will be required during the coming decade--more if records activity of the Institution increases during that period.

Without additional funds for commercial storage space, archival material will continue to be placed in temporary storage on the A&I balcony. This is a hazardous

condition and will continue as archives grow more numerous. Storage of permanently useful records will be dispersed, at a greater cost and inconvenience to access and management, among the many operating offices and bureaus of the Institution. Beyond these immediate effects, failure to come to terms with the inevitable growth of Institutional records jeopardizes the entire archival function. The Institution's ability to provide convenient and reliable access to its own records through a central archives is severely reduced, thereby jeopardizing not only Institution-wide accountability but also future research in its records by historians.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are provided by annual allotment and are used to cover the salaries and benefits of an archivist, an archives technician, an archives specialist, and three program assistants, and various associated support costs.

SMITHSONIAN INSTITUTION LIBRARIES

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	96	4,881	10	392	--	112	--	22	--	--
FY 1988 Estimate	98	5,039	10	388	--	58	--	--	--	--
FY 1989 Estimate	99	5,108	10	390	--	3	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Libraries (SIL) serves the Institution and the public by providing information services to support Smithsonian research, curatorial, publication, and administrative activities; through direct participation in the creation of a national bibliographic data base; and through programs for publications, exhibitions, loan and information services. Its collections of approximately 980,000 volumes, including over 20,000 serial subscriptions, are available to Smithsonian and outside scholars through a system of 14 branch libraries in 36 locations in the Washington, D.C. area; at the Smithsonian Astrophysical Observatory (Massachusetts and Arizona); the Cooper-Hewitt Museum (New York City); and the Smithsonian Tropical Research Institute (Panama). SIL is also responsible for purchasing all books for the Smithsonian and coordinating all requests for automated information sources; these services help to avoid duplicate procedures and expense within the Institution. For FY 1989, an increase of 1 workyear and \$69,000 is requested to expand its capability to locate and borrow research material from other libraries in a timely manner to support Smithsonian research needs.

PROGRAM - The Smithsonian Institution Libraries (SIL) provides both centralized Institution-wide support and branch libraries with specialized subject research collections to serve the research, curatorial, and other bibliographic needs of Smithsonian programs. The central collections emphasize multidisciplinary research journals, proceedings of academies of science, and interdisciplinary topics such as ecology, exploration and travel, and museology. The specialized collections in the branch libraries are outstanding in natural history, American ethnology and culture, tropical biology, decorative arts and design, astrophysics and the history of science and technology. Rapidly developing collections include aeronautics and astronautics, African art, conservation research, and horticulture. SIL's collections include approximately 35,000 rare books, primarily in science, technology, applied art, aerospace, and natural history. The largest of these rare book collections is the Dibner Collection in history of science and technology, consisting of 19,000 volumes and manuscripts.

The SIL is composed of three operational divisions: Research Services, charged with direct, individual reference assistance and literature search and interpretation for the scholarly clientele of the central and branch libraries; Collections Management, responsible for the selection, acquisition, and preservation of library collections; and Automated Systems, responsible for managing the SIL bibliographic data bases, cataloguing and other automated inventory control of SIL collections, and the application of automation to other aspects of the Libraries' operations. Through centralization of certain operations, including acquisitions and cataloguing, an interdisciplinary reference/information center, a consolidated administrative staff, and a conservation laboratory, SIL has achieved system and cost efficiencies.

Research Services - The primary function of the Research Services Division of the Smithsonian Institution Libraries is to provide reference support for the research and other activities carried on in the museums, bureaus, and offices of the Institution. To this end, SIL is organized into 14 branch libraries which occupy space in 36 separate locations in order to bring both the collections and professional library services as close to the users as possible. The branch staffs range in size from one to a dozen members, depending on the size of the book collections to be serviced and of the user population. All, however, even the smallest, offer sophisticated subject and professional expertise to ensure that users can find the sources they need efficiently and expeditiously. In FY 1987, Smithsonian staff borrowed more than 30,300 items from the SIL collections. In addition, over 14,200 items were photocopied from materials such as journals which do not circulate or for which the user wanted his own copy. The SIL also loaned almost 4,200 titles to other libraries and made photocopies of approximately 2,600 items in response to requests from other libraries.

The library staff draws not only on the collections which have been developed over the years in each subject area to support the research of Smithsonian scholars, scientists and curators, but also upon the resources of the nation's libraries as a whole. When a particular article or monograph is not found in the SIL, the library staff searches published catalogues, printed indexes and one or more of the national bibliographic data bases to identify a library holding that item. A request to borrow is then placed by using an electronic telecommunications network or by mail. During FY 1987, the Libraries borrowed almost 12,000 items from other libraries through these interlibrary loan services.

In addition to locating and making available sources of information for users, the Research Services staff in many instances provides the needed information directly. In FY 1987, they responded to more than 114,300 reference questions. These ranged from simple requests for names, dates and places to complex questions requiring several hours, if not days, of investigation to answer, using both standard reference tools and electronic data bases. Since some patterns soon become apparent in the kinds of reference questions being received in a given subject area, many branches anticipate such requests by producing form letters or compiling bibliographies on specific topics. Thousands of these are distributed annually in response to inquiries, especially by the branches in the Museum of African Art, the National Zoo, the Museum Reference Center, and the Anthropology Library in the Natural History Branch. Some have become so well-known that they are sent on a regular basis to other libraries, both in this country and around the world, to help librarians and researchers elsewhere with the same questions.

The Research Services Division is also responsible for the housing and maintenance of the collections. In FY 1987, several branches underwent moves to provide them with better arranged and higher quality space. The Office of Horticulture Library and the Museum Reference Center, both in the Arts and Industries Building, were remodeled, reconfigured and reequipped. The Museum of African Art Library was moved from its original Capitol Hill location to the Museum's new facilities in the Quadrangle complex on the Mall. The Museum of American History Library began planning the move of the collections stored in the basement of that building to the SIL facility at 1111 North Capitol Street. The Museum of Natural History Branch undertook the mammoth task of integrating 160,000 volumes from three locations into its newly renovated and expanded library.

Collections Management - The responsibilities of the division include selection, acquisition, deaccessioning and preservation of collections for SIL. Materials selectors in each SIL branch recommend books and journals for acquisition and form a committee to advise management on collection policies. During FY 1987, SIL completed a major revision of its collection management policies, including individual statements for each branch. This revision was forwarded to the Smithsonian's Office of the Registrar to begin the institutional review process.

In 1987, SIL launched an effort to review and reorganize the library and gift collections stored at the Smithsonian Institution Service Center at 1111 North Capitol Street. All gift collections awaiting selection were reviewed; unwanted materials were discarded; and stockpiles of Smithsonian publications and translations were reduced. A contractor sorted and organized a 45,000-piece collection of trade catalogues into an alphabetical arrangement by company name. This work was in preparation for construction to improve the environmental conditions of the Libraries' facilities there, prior to establishing it as a combined service facility, designated as the Smithsonian Institution Libraries Remote Annex (SILRA). SILRA will house less heavily used library collections under the management of Central Reference and Loan Services and also serve as a processing/staging area for large collections and as a preservation facility.

The Libraries continued to address the recommendations contained in the Final Report of the Preservation Program (May 1986). The proposed plan of action pointed to the need for SIL to increase the resources devoted to preservation of its general collections (items not housed in rare book facilities). In particular, the plan highlighted the fact that nearly one-third of the SIL collections, including over 90 percent of the volumes published between 1870 and 1930, are too brittle to withstand further use. Recruitment began in the mid-summer of 1987 to hire a preservation specialist to initiate, establish, and administer the policies and procedures needed to tackle this problem. Since brittle paper cannot be restored, a variety of options will be needed, which may include both replacement of materials and conversion to more stable formats, such as microform.

Automated Systems - Since FY 1974, SIL has participated in a national bibliographic data base, the Online Computer Library Center, Inc. (OCLC), with 6,000 member libraries, which is used as a source for creation of its bibliographic records and for interlibrary loans. In 1984, the Smithsonian implemented its on-line automated bibliographic system, the Smithsonian Institution Bibliographic Information System (SIBIS). SIBIS allows the Libraries to create an integrated on-line system with a central data base of bibliographic information, thus eliminating the need for multiple keyboarding and manual processes. SIL is gradually replacing all card catalogues, microfiche catalogues, circulation files, and other

paper files, with a single source of bibliographic information that can be updated continuously and accessed from locations anywhere in the Institution. The SIBIS acquisitions module permits on-line book and journal ordering, processing of orders, account maintenance, interface with accounting, and ready on-line access to order information. Researchers in the field are now able to dial into the SIL catalogue for information and will eventually relay requests from wherever there is a computer/telecommunication link. The on-line catalogue provides more and better access to the collections employing sophisticated search keys, such as key word and Boolean logic.

At the close of FY 1986, SIL implemented an Electronic Mail System linking all of its staff through quick electronic communication. Early in FY 1987, a tape of all SIL holdings was sent to a major library support company for matching with Library of Congress authorized names and subjects. This will enhance access to the collection allowing cross references in the on-line catalogue. A tape of SIL museology holdings was produced for loading on the International Council of Museums (ICOM) computer in Paris. Management, processing, and user requested reports continue to be programmed from the automated library system. Further, SIL planned and implemented an Office Automation System for the central administration in 1987.

At the end of FY 1987, the contract portion of retrospective conversion of manual bibliographic records to machine-readable form was substantially completed. In addition, during FY 1987, barcodes were automatically assigned to all of the machine-readable records of the SIL and barcode labels were produced. These are now being applied to over 450,000 volumes.

During FY 1987, the Libraries also continued to make measured progress in the cataloguing of previously uncatalogued backlogs, including rare books, gift and trade literature collections. Although contracts for retrospective conversion and cataloguing, and rare book cataloguing, plus increased use of volunteers and new technologies afforded by the automated system have reduced the number of items left uninventoried, the Libraries are particularly eager to eliminate the uncatalogued backlog of rare books, which had been the subject of the findings of several audit reports on the Libraries' collections. During FY 1987, the first in a series of contracts was awarded for the cataloguing of rare materials. With funding requested in FY 1988, the Libraries will be able to accelerate the cataloguing of these uncatalogued materials. With the expanded base funding of \$295,000, the Libraries projects that at current prices it will take at least seven years to catalogue all previously uncatalogued material in its collections.

Outreach - The Libraries continues its commitment to national and international responsibilities in the areas of exhibitions, seminars, lectures, publications, translations, and participation in national and international forums.

In FY 1987, the SIL Lectures and Seminar Series included "The 'Wheel of Aristotle' in Guevara and Galileo" delivered by William A. Wallace of Catholic University and presented in honor of Silvio A. Bedini who retired after 26 years at the Smithsonian. The lecture was given in conjunction with an SIL exhibition on "Aristotelian Science in the Dibner Library." On September 11, 1987, SIL will present a panel discussion open to the public entitled "Books in the Attic: What Are They Worth?" featuring Willis Van Dervanter, an appraiser; Allen Ahearn, proprietor of Quill and Brush which specializes in first editions; Ellen B. Wells, Chief Librarian of SIL's Special Collections Branch; and moderated by John Y. Cole, Director of the Center for the Book of the Library of Congress.

The tenth anniversary of the opening of the Dibner Library of the History of Science and Technology was celebrated in October 1986 with the opening of "Nota Bene," an exhibition featuring 29 annotated rare books dating from 1469 to 1921. The second exhibition honoring the Dibner Library's tenth anniversary year, "Aristotelian Science in the Dibner Library," opened in January 1987 and featured 19 manuscripts and early printed books also collected by Dr. Dibner. Both exhibitions were described in handsomely printed checklists. In March, the Dibner Library mounted an exhibition of rare books, "Classics of Physiology," commemorating the founding of the American Physiological Society in 1887.

From July through September 1987, SIL celebrated the tenth anniversary of its Book Conservation Laboratory by an exhibition and a catalogue describing conservation materials and techniques, bindings, treatments, and methods of paper restoration.

With funding provided through the Institution's Special Foreign Currency Program, the Libraries administers the Science Information Program for Translations. Continuing funding for this program will be sought from the U.S.-India Fund for Educational, Cultural, and Scientific Cooperation. Through this program, scholarly articles and monographs on the natural sciences and cultural history originally published in foreign languages have been published and made available to American scholars in English translations. The published translations are registered with the National Technical Information Service (NTIS) and the National Translations Center to ensure their wide-spread availability to scholars. Currently SIL is administering the editing by scholars of 16 translated manuscripts, and nine other works are in production in India.

In July 1987, the SIL Publications Program co-published with the American Cut Glass Association L. Straus & Sons Richest Cut Glassware, a facsimile of a 19th-century trade catalogue with an introduction and index added. Research continued on two more books in the SIL Research Guide Series. Libraries and individuals around the country continued to request copies of the popular Book Collecting and the Care of Books. A total of 1,075 have been distributed since the pamphlet was first issued in 1985, and a new edition was prepared for distribution in September 1987. Branch library guides were printed for the new Museum of African Art Branch which will open in September 1987 and for the National Museum of Natural History Branch which was renovated in the same year. A brochure on "Gift Information for Donors" was printed and several information sheets for users and visitors were made available in the 14 branch libraries.

SIL staff participated in a number of professional meetings and published collectively five books, 24 articles, two reports, and many book reviews since FY 1986. SIL welcomed visitors from the United States library community as well as librarians from the People's Republic of China, Japan, and Indonesia.

EXPLANATION OF PROGRAM INCREASE:

Expanded Support for Interlibrary Loan Services (1 workyear and \$69,000) - The primary mission of the Smithsonian Institution Libraries is to support Smithsonian research by providing accurate and rapid access to information and recorded knowledge. SIL achieves this goal through construction of high quality indexes to the materials in the Smithsonian collections, delivery systems, reference services, interlibrary loan (ILL), on-line document delivery, circulation, intralibrary

lending and physical delivery of material between SIL branches and local libraries including the Library of Congress (LC), the National Agricultural Library (NAL), and the National Library of Medicine (NLM). For FY 1989, an increase of 1 workyear and \$69,000 is requested to expand its capability to locate and borrow research material from other libraries in a timely manner.

Smithsonian researchers are often impeded in their work because the collections of the SIL do not contain the source materials required or because the materials cannot be readily identified, located and delivered from outside. Obtaining the necessary research materials by means of traditional ILL services, either from other national libraries such as the Library of Congress or the National Agricultural Library, or from libraries elsewhere in the country, is a cumbersome and time-consuming process with an average response time of one month from request to receipt of material. The SIL wants to remedy this situation so that a researcher can reasonably expect to find the information he needs within the collection or have it procured for him within two weeks.

During FY 1985, SIL conducted a study to analyze fulfillment rates and turnaround times for ILL requests for journal articles. A substantial portion of requests (39 percent) sent by traditional means -- i.e., mailing out the traditional American Library Association forms -- were not filled within a three-month period.

Response is much better when the Online Computer Library Center, Inc. (OCLC) is used as the means of transmitting the request. Eighty-five percent of the items are found in the first library queried by the computer and only five percent remain unfilled when they have been searched for in all five libraries to which an OCLC query is automatically transmitted. Another means of filling requests is to use commercial, automated, document-delivery services, which has proved remarkably effective. All rejects from traditional queries have been passed on to such a service and of the several hundred now processed, only three have, to date, not been located anywhere.

Turnaround time shows a parallel gradation of effectiveness. Traditional requests take an average of one month for return of the item. This figure includes the national libraries (such as the Library of Congress, the National Agricultural Library and National Library of Medicine). The document delivery services have been responding in under 10.5 days. Since rapid service is a prime consideration in the provision of SIL services, the use of a computer-based, document-delivery service would allow the Libraries to achieve this goal effectively.

Use of commercially available document delivery services to retrieve research material from other libraries, especially journal articles, which otherwise would be requested through interlibrary loan, will further improve service to researchers by freeing staff time for more direct research support. In FY 1987, SIL borrowed approximately 12,000 items; an on-line document delivery service would enable a substantial increase in direct service to readers as requests to a document delivery service do not have to be verified, which represents at least one-third of the total labor involved in the borrowing process. Moreover, since some commercial services (including one in Rockville) are willing to accept the users' request slips, another 22 percent of staff time now engaged in typing or in-putting ILL requests could be turned to other types of research support. Thus, expanded use of these services is the most effective way to increase the productivity of SIL branch

staff and allow them to provide a higher level of support for other reference services.

In FY 1987, the SIL devoted \$25,000 from its book budget to continuing the use of on-line document delivery services since its importance to research is paramount. The experience gained indicated that this is the most cost effective and the most suitable response to Smithsonian research needs. For FY 1989, the requested increase of \$50,000 would allow the Libraries to establish a stable base of funding to use on-line document delivery for interlibrary loan. This is the single most effective step which may be taken to permit rapid, comprehensive and efficient library support for current research of all kinds at the Smithsonian.

A second important step in improving the delivery of the information needed by Smithsonian users would be to reduce the turnaround time required for filling ILL requests from the Library of Congress, which accounts for one-third of ILL borrowing. Increased borrowing from the Library of Congress by other libraries nationwide and budget and staff cuts at the Library of Congress have created a serious bottleneck in the provision of interlibrary loan services. As a result of a cooperative agreement, the Smithsonian Institution Libraries maintains a "SIL desk" at the Library of Congress to expedite the high volume of ILL processing for material borrowed by Smithsonian staff. For FY 1989, an additional library technician position (1 workyear and \$19,000) is requested by SIL for its ILL unit to assist in locating materials at the Library of Congress, in checking them through the Library of Congress circulation system on a priority basis, and in photocopying those which do not circulate (i.e. all serials).

By providing prompt and accurate delivery of information to researchers, the SIL will help to insure the quality of Smithsonian program products. Moreover, SIL's intention to improve the delivery of source materials to Smithsonian scholars will have direct impact on research at the Smithsonian.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Funds supplied by administrative allotment are used primarily for salaries and related support costs including travel, training, and supplies. A program allotment supports such special events as public lectures and seminars. In addition, a special purpose fund awarded in 1984 has been supporting the dissemination of information by enhancing the collections and services of SIL, and preservation of library materials through binding and other restoration programs. This fund is expected to be depleted in FY 1987.

Restricted Funds - These are provided through gifts and grants from individuals, foundations, endowments, organizations and corporations for specific purposes. These funds will support the preparation costs for a future publication on international exhibitions and provide for the purchase of rare volumes on the history of science.

MAJOR SCIENTIFIC INSTRUMENTATION

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	--	--	--	--	--	--	--	--	--	--
FY 1988 Estimate	--	525	--	--	--	--	--	--	--	--
FY 1989 Estimate	3	1,405	--	--	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The development of major scientific instrumentation for Smithsonian research programs is important to enable them to remain at the forefront of their fields. Because of the magnitude of the costs involved in the alteration or reconfiguration of existing instrumentation and in the fabrication of new instrumentation, and the unique aspects of the work to be done, funding is requested for projects of this sort under this new line-item, rather than under individual bureau line-items. Since these projects will, of necessity, require long-term development as well as multi-year funding, it is requested that these funds be made available until expended, unlike the remainder of the Salaries and Expenses appropriation which is a one-year appropriation.

For FY 1989, an increase of 3 workyears and \$880,000 is requested to initiate the design of a Submillimeter Telescope Array (3 workyears and \$810,000), and to continue the conversion of the Multiple Mirror Telescope (\$70,000). (The FY 1988 and FY 1989 estimates also reflect the transfer of the Smithsonian Astrophysical Observatory's base funding of \$525,000 associated with the MMT conversion, originally requested for FY 1988 in that bureau's line-item.)

PROGRAM - The development of major pieces of scientific instrumentation, such as telescopes, requires careful research and development over an extended period of time by concentrated teams of in-house scientists and technicians for such critical sub-elements as optics, detectors, receivers, and structural forms. It has become increasingly difficult to conduct orderly and cost-effective long-term planning for the design and construction of major pieces of instrumentation within the restriction of the traditional one-year funding provided by the Salaries and Expenses appropriation.

To accommodate the unique research and development (R&D) requirements for acquisition of major pieces of scientific instrumentation, this new line-item has been established. A no-year provision for this line-item will allow the flexibility that is so critical to the development of telescopes and other leading edge

scientific tools. The development of such instruments, involves, almost by definition, the unknown, since researchers are pushing back the frontiers of science and technology. As a result, certain sub-elements of a particular instrument may develop at different rates, requiring budgetary flexibility among sub-elements. In addition, different projects could develop at different rates, for which such flexibility would be at least as helpful.

Beginning in FY 1989, funding is requested under the Major Scientific Instrumentation line-item for two projects for the Smithsonian Astrophysical Observatory: (I) the development of an array of submillimeter telescopes; and (II) the conversion of the Multiple Mirror Telescope. Both of these cutting edge scientific projects involve the fabrication of major new instrumentation that will take a number of years to design and complete. The development of the submillimeter telescope array is anticipated to continue through the mid-1990s and will require total funding currently estimated at \$30 million (1987), for construction on a continental site, and about 25 percent more for construction on a prime site in Hawaii. The conversion of the Multiple Mirror Telescope, which might be completed as early as 1992, will require an estimated total funding of \$10 million from the Smithsonian.

EXPLANATION OF PROGRAM INCREASE:

Construction of an Array of Submillimeter Wavelength Telescopes (3 workyears and \$810,000) - The last frontier for ground-based astronomy consists of observing the skies with telescopes sensitive to submillimeter waves--light with wavelengths between those of infrared and radio waves. The formation of stars and planetary systems and the puzzling processes taking place in the cores of galaxies and quasars can best be studied at submillimeter wavelengths because the radiation from these objects is usually much more intense at these than at other wavelengths. In the past few years, technology has advanced sufficiently to allow instrumentation to be built with characteristics suitable for use in submillimeter-wavelength astronomy.

The desirability of submillimeter wavelength observations was recognized in the 1982 ten-year plan of the Astronomy Survey Committee of the National Research Council (NRC), and several single-antenna telescopes designed for submillimeter wavelength work are now beginning construction or operation. These telescopes are expected to dramatically advance the field, but none of them will be able to discern details finer than about 10 seconds of arc. Therefore, their resolving power will be nearly a hundredfold inferior to that of the leading astronomical instruments in other wavelength regions, including the Very Large Array (VLA) and the Hubble Space Telescope (HST), and will even be about tenfold inferior to that of ground-based optical telescopes.

The NRC study also recommended development of advanced spatial interferometers at all wavelengths as a means of improving resolving power. SAO's proposed submillimeter wavelength telescope array will be a premier realization of the NRC's recommendation. The idea for this array stems from 1984 when a committee of seven SAO scientists published a study reporting on the scientific need for, and technical feasibility of, such an interferometric array. In particular, the committee recommended an array of six submillimeter wavelength telescopes, having resolving power of better than 1 second of arc--far finer than that of any single-antenna submillimeter wavelength telescope, and comparable to that of the VLA and HST. This 145-page report was distributed among astronomers worldwide, and detailed

solicited reviews were received from 25 astronomers with relevant expertise (about a dozen other signed reviews were also received). The consensus conclusion of the report and of the reviews is that a submillimeter wavelength array has very high scientific potential, is technically feasible, and is of appropriate scale for undertaking by SAO.

The main recommendation of the report, and of many of the reviews, was that SAO first develop expertise in submillimeter receiver techniques, a new and growing field of critical importance for the array. With \$150,000 funding provided in FY 1987, SAO has begun development of submillimeter wavelength receiver instrumentation, including hiring a receiver scientist, and establishing and equipping a research laboratory. With the increase of \$252,000 requested for FY 1988, SAO will continue to develop the technology for submillimeter receivers and, in particular, to build receivers for use on existing telescopes.

With the SAO receiver effort underway, it is appropriate to develop a detailed design for the array. The requested increase for Instrumentation for FY 1989 would allow SAO to hire a project scientist, a digital leader, and a software leader to conduct the two-year design study. They will study possible array sites and telescope layouts; antennas, correlators, computers, and receivers; and the cost-benefit tradeoffs associated with the designs of the individual systems and their integration into a functioning array. Together with the receiver leader (hired by SAO in FY 1987), these scientists will consult with outside experts, build system prototypes, and conduct computer simulations as part of this study.

The main elements of the FY 1989 design study (and their costs) are receiver prototypes (\$295,000); digital correlator prototypes (\$210,000); antenna options (\$60,000); computer options (\$60,000); site visits and analyses (\$13,000); and the personnel costs of the new staff mentioned above (3 workyears and \$172,000). The receiver costs are primarily for equipment and materials, and are based on the assumption that the funding requested in the FY 1988 budget for the development of submillimeter-wave receivers will be retained in SAO's funding base. The design study will take two years to complete, and will pave the way for the start of major construction. If construction proceeds at the end of the two years, then over the five-year period, starting with FY 1989, the projected costs are currently estimated at a total of approximately 20 million (1987) dollars, as indicated in the following chart. The projected total number of new positions required for this project is 33, with six positions added in FY 1990, 13 in FY 1991, nine in FY 1992, and the last two in FY 1993.

PROJECTED FUNDING FOR SUBMILLIMETER TELESCOPE ARRAY
FY 1989 - FY 1993
(FY 1987 Dollars)

	<u>FTE</u>	<u>(\$ millions)</u> ^{/1}
FY 1989	3	0.8
FY 1990	9	1.7
FY 1991	22	5.8
FY 1992	31	6.2
FY 1993	<u>33</u>	<u>5.5</u>
TOTAL	98	20.0

^{/1} Rounded to the nearest \$100,000

Completion of the array is expected to take an additional two years (after FY 1993), and to cost an additional \$10 million (over the \$20 million). These estimates include 20 percent for contingencies and assume that the array will be located on a continental site. Construction on a prime non-continental site, such as Mauna Kea, Hawaii, would cost about 25 percent more. Such a location, however, might be preferable because it would provide a significantly larger percentage of time when the array could be used to its fullest capability, thus maximizing the scientific return. Annual operating expenses for the array are estimated to be about 8 percent of construction costs.

A submillimeter wavelength array as envisioned by SAO will make fundamental contributions to astronomy and astrophysics in at least four areas. (1) For studies of star formation, the array offers the prospect of detecting and studying long-sought evidence of gas falling into very young stars. The array will provide images of high-velocity flows from recently formed stars with unprecedented resolution and sensitivity, thus elucidating the mechanism that limits the growth of a star. The array will map the structure and motions of the disks that eventually contract into stars and allow scientists to study their role in forming multiple star systems and planets.

(2) The array will make fundamental contributions to the study of galaxies. Detailed maps of the regions from which emission from carbon monoxide molecules comes will provide for the first time a clear view of the spiral structure of galaxies outlined by giant molecular clouds. At the same time, the array will allow the emission from the dust surrounding young stars to be studied, and so reveal centers of star formation not visible with optical telescopes. These two new views of galactic structure will add greatly to our understanding of the origin and maintenance of the spiral patterns in galaxies.

(3) Because of its high sensitivity, the array will provide accurate measurements of the submillimeter wavelength emission from quasars and active nuclei of galaxies--to clarify the relationship between these enormously energetic objects and to try to learn the source of their energy. These measurements will be crucial to distinguishing between the mechanisms leading to quasars that emit radio waves and those that do not, one of the most important unsolved mysteries in our quest for understanding the source of energy in quasars.

(4) The array will give new information about the surfaces and atmospheres of planets and other objects in the solar system. Maps of Mercury, Mars, Saturn's rings, and some dozen other bodies will reveal the temperature and structure immediately beneath the surface and provide information needed to understand the nature of the subsurface composition. Observations of the emission from molecules in the atmospheres of Venus and Saturn's satellite Titan should also provide insight into planetary weather.

In addition, the array is likely to make unexpected discoveries, since only a few telescopes will be able to work at submillimeter wavelengths, and since the array's ability to discriminate spatially will be at least ten times greater than that of any of these other, single, submillimeter telescopes.

The studies mentioned above involve research programs conducted in all of SAO's divisions, and scientists from each division would be involved in the observations and in their analysis and interpretation.

When it becomes operational, the SAO submillimeter wavelength array will be a major scientific instrument of international stature. If begun soon, it will be unique in the world in its combination of wavelength coverage and resolving power, and it is therefore important to the scientific competitiveness of the United States that the array be built--other countries, such as the United Kingdom, are already beginning to plan such instruments. Since astronomical observations from space are suffering severe delays, due to the Challenger tragedy, the construction now of pioneering ground-based instruments such as the SAO array is especially timely.

Conversion of the Multiple Mirror Telescope (\$70,000) - With base funding of \$525,000 requested in FY 1988, SAO will begin the design work to convert the Multiple Mirror Telescope (MMT) by replacing the six mirrors of the MMT with a single, 6.5-meter diameter, mirror, the largest that can fit in the present MMT structure. This improvement is the most cost-effective approach to ensure that Smithsonian astronomers remain in the forefront of optical and infrared astronomy through the remainder of the twentieth century. Because this conversion would have the great advantage of being a modification to an existing facility where many of the subsystems--the telescope mount and the rotating building, for example--would remain intact, substantial saving will result in comparison to building a new facility. At the same time, the telescope is expected to be out of use for only six months or less. The MMT conversion might be completed by 1992 with a relatively modest total expenditure by the Smithsonian of approximately \$10 million. This total is composed of the amounts proposed for expenditure in FY 1987 for glass and refractories, mostly from Institutional Trust funds, and of the amounts indicated in the following chart.

PROJECTED FUNDING FOR CONVERSION OF THE MULTIPLE MIRROR TELESCOPE
FY 1988 - FY 1992
(FY 1987 Dollars)

	<u>(\$ millions)</u> ^{/1}
FY 1988	0.5
FY 1989	0.6
FY 1990	2.5
FY 1991	3.9
FY 1992	<u>1.8</u>
TOTAL	9.3

^{/1} Rounded to the nearest \$100,000

For FY 1989, the requested increase of \$70,000, along with the base funds of \$525,000, will be used to fabricate a support for the mirror during grinding, and to begin the next step in the design of mechanical aspects of the telescope structure, including the optical support and the mirror cell. (The sum of \$525,000 requested for FY 1988 will be part of the regular one-year appropriation. For FY 1989, the total amount of \$595,000 is requested as no-year funding, to be available until expended.)

The converted MMT will have twice the collecting area of the present instrument and be able to observe nearly one hundred times more of the sky at any one time. This wide field of view of the converted telescope will allow observation of many objects simultaneously and, for certain types of problems, will realize

upwards of a hundredfold increase in efficiency of data collection over that now possible with the MMT. This new capability will be especially beneficial for the study of clusters of stars and galaxies. Projects such as studies of the dynamics of clusters of stars, in which SAO scientists have been very active, and which require many nights on the MMT, could be completed in a few hours. The similar study of clusters of galaxies, hitherto prohibitively demanding of telescope time, also becomes feasible. These latter investigations may hold the key to our understanding of how most of the matter in the universe is distributed. This distribution has a fundamental bearing on the evolution of the universe, in particular on how galaxies formed--a basic question that has baffled scientists for decades.

The increased collecting area of the converted telescope will allow data of the same quality as now obtained to be gathered on objects 2.5 times fainter. This improvement will allow the converted telescope to be used in many new areas of research, where the present telescope is limited by the extreme faintness of the objects involved. The added light-gathering power means that more than twice as large a part of the universe is accessible for study than is now possible. SAO has already established itself as a world leader through the discovery and study of the "bubble" structure of the universe, and expanding such studies beyond the MMT's present horizon will be very important to determine if even larger structures exist; if they do, our understanding of the evolution of the universe might again have to be entirely rethought.

In addition, it will be possible to measure the velocities of gas in very distant galaxies. These velocities, which are often related to the intrinsic brightnesses of the galaxies, can then be compared with the apparent brightnesses of the galaxies to determine their distances. This technique would allow us to determine the rate of expansion of the universe when it was younger, another critical measurement for understanding the evolution and ultimate fate of the universe: will it continue to expand forever, or will it eventually collapse?

The increased collecting area will for the first time, too, allow the study of certain rapidly changing astrophysical phenomena. In such cases, changes occur too rapidly to be studied with any of today's telescopes; for example, some of these rapidly changing processes take place in double stars whose members are so close to each other that their surfaces almost touch, and in systems with one star whose core is so dense that not even light can escape from it--a black hole. Such systems give rise to very unusual conditions, the study of which would allow us to gain insights into new physical processes.

These examples provide just a small sample of the scientific justifications for the conversion of the MMT. A conference held at SAO in April 1986 resulted in a 50-page proceedings which discusses in more detail the various justifications for the conversion.

The timing of the conversion depends on the availability of the large facility at the University of Arizona that will cast and polish the mirror. The mirror for the MMT conversion is now scheduled for the period between the initial operation of the facility and its expansion to produce mirrors eight meters in diameter. If funding limitations make it impossible to take advantage of this opportunity, the MMT conversion would be delayed for many years, in view of the present demand for eight-meter-diameter mirrors. Such a delay would lead to a substantial loss of research opportunities, and SAO's preeminent research position would be seriously

eroded. In addition, when coupled with the increased attraction of institutions that will have large telescopes, a delay would make it increasingly difficult to bring the best young scientists to SAO or even to maintain the quality of the present research staff.

OFFICE OF ASSISTANT SECRETARY FOR MUSEUMS

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	24	1,060	1	147	--	83	3	349	--	--
FY 1988 Estimate	24	1,086	1	190	--	65	--	182	--	--
FY 1989 Estimate	24	1,111	1	193	--	56	1	81	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Museums coordinates and provides direction to the Institution's museum-related activities, including collections management, exhibitions, education, and public orientation, maintains a liaison with national and international museum organizations and undertakes special studies for museum operations and methodologies. The Office of Museum Programs and the Office of the Registrar are contained in this line-item. For FY 1989, the Office of Museums Programs requests an increase of \$25,000 to fund travel and per diem for Native Americans seeking museum careers. This increase will allow for internships and participation in workshops and seminars on museum practices.

PROGRAM - I. The Office of the Assistant Secretary for Museums - The Office superintends the museum-related functions of the Smithsonian museums and bureaus. The Office also administers projects, programs, exhibitions, and publications commemorating significant individuals and events; the Collections Acquisition Program, which was established to facilitate the purchase of major acquisitions by the Smithsonian museums; the Special Exhibition Fund, which provides partial funding for important and/or innovative exhibitions; and the planning for the General Post Office Building. It also coordinates the activities of Native American programs throughout the Institution.

In addition, the Office works closely with national and international museum organizations and professionals to enhance the scholarly, exhibition, educational, and collections management functions of museums; to encourage the development and application of new techniques in museum administration and practices; and to establish and improve museum training programs, particularly in the field of conservation.

II. Office of Museum Programs - The Office of Museum Programs (OMP) conducts specialized services and training programs for museum personnel from American and foreign museums. These programs include approximately 50 museum practices workshops annually both at the Smithsonian and in other locations; activities designed

particularly for the Native American community; internships in museum practices; visits to the Smithsonian for museum professionals; and conducts an annual minority awards program. The Office offers special conferences and consultations. Museum consultations and career counseling were provided for over 200 national and international students and museum personnel in FY 1987. The Office also produces and distributes informational and audio-visual presentations on conservation and museum practices for loan and sale to museums and educational organizations. The Office currently is involved in a 6-year project, to investigate how museums can increase their educational contributions to the community. In addition, the Office provides program supervision for the Museum Reference Center, which is the major library source of museum-related information in the United States.

The Native American Museums Program of the Office of Museum Programs coordinates Native American training, services and specially designed educational opportunities for those who are involved in the study and preservation of Indian, Inuit, and Aleut collections. In FY 1986, the program sponsored an Exhibition and Design Workshop and practicum that included onsite technical assistance; produced the slide-tape program, "Tribal Archives: Getting Started"; published the proceedings of the 1983 National Workshop; updated the Resource Guide; compiled for publication "A Brief Reference Guide for Material Collections Concerning Native American Culture and History," and "Native American Collections held in European Museums and Archives"; and produced information packets, audio-visual productions and a newsletter. In FY 1987, the Native American Program focused on individually-designed training opportunities for mid-career employees. Five Native American participants attended a week-long OMP workshop as well as investigated a particular topic in-depth for durations ranging from two weeks to three months. The publication activities for a mailing list in excess of 5,000 names, and consultations services for approximately 200 written and walk-in requests continued. Planning was initiated for a potential 1988 museum management workshop and for a future seminar on cultural differences which is anticipated to include a film on ecomuseums.

III. Office of the Registrar - The Office of the Registrar is responsible for the development, oversight, and coordination of the Smithsonian's collections management policies. In FY 1986, the Office of the Registrar established a steering committee to plan and promote an Institution-wide interactive information environment. The Office of the Registrar reviews collections accountability procedures, including the inventory-related activities of the Institution. The Office acts as an advocate for continued support and as a catalyst for new initiatives to insure physical care of the National Collections. The Office serves as a central outreach unit, bringing Smithsonian collections management programs to the attention of Smithsonian management and to the wider museum community.

The Office coordinates the Smithsonian Registrars Council which conducts cooperative, inter-bureau efforts and which acts as an information exchange opportunity to the membership. In conjunction with the Office of Museum Programs, the Office facilitates regular seminars and workshops on aspects of collections management.

EXPLANATION OF PROGRAM INCREASE:

For FY 1989, the Office of Museums Programs requests an increase of \$25,000 to fund travel and per diem for Native Americans seeking museum careers. This

increase will allow for six internships and participation in workshops and seminars on museum practices.

For ten years, the Office of Museum Programs has directed its attention to immediate needs of tribal museums: planning and organizing a new museum, skill building for museum staff, resource development, advocacy and liaison services. The Office has worked with over 120 individual tribal and urban native groups (often in multiple projects), produced publications, conducted workshops, provided technical assistance and designed residency opportunities. Staff training has been directed toward mid-career employees. The training offerings have been short-term in duration, increasing in complexity as reflected by the needs of tribal institutions.

The new initiative planned by OMP responds to an important new phase in the preservation of tribal heritage. Young Native Americans are developing an interest in museum careers and are anxious to gain work experience that will complement their academic study. Through this program, experienced students will be able to contribute to the professionalism of tribal cultural institutions for which they work as well as to the museum field. This training is a commitment to the future leaders and is important for promoting understanding among different cultures.

The internships will last a maximum of 12 weeks. The course of study will be individually designed to build upon each participant's special needs and career goals. Students will be supervised by the Program and will be given responsibility for a discrete project related to their area of interest. Students also will gain an overview of museum functions and an understanding of available national museum resources and have the opportunity to develop valuable contacts with other museum professionals. The internships are intended to support and strengthen the educational outreach responsibilities of the Institution through the development of staff in Native American museums and cultural centers and to promote understanding of other cultures.

The requested increase of \$25,000 will support travel and per diem expenses for six Native Americans. Participation will be encouraged especially from ethnic/racial heritage areas which have been under represented in the museum field, i.e., Alaska, Hawaii and the Pacific Trust.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are provided by annual allotments and small fees for services. The allotments support the costs associated with the Office of the Assistant Secretary and provide for memberships for the Institution in the American Council of Learned Societies and the American Crafts Council. The Office of Museum Programs has two revolving Trust funds for training and for the audio-visual loan program to accommodate small fees for services.

Restricted Funds - The Office of Museum Programs received a grant of \$1.1 million from the Kellogg Foundation in 1982 for a project to "expand the educational influence of museums." The original three-year grant expired at the end of FY 1985. The Kellogg Foundation has agreed to continue the grant through FY 1988. The purpose of the grant is to enable the Smithsonian to assume a leadership role in the establishment of a network of museums in the United States to examine issues and provide means of implementation so that museums can increase their educational

impact in their communities. All aspects of museum operations are being explored with decision-makers from museums and with representatives from other educational sources.

NATIONAL MUSEUM OF NATURAL HISTORY/MUSEUM OF MAN

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
	FTE*	Amount	General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	530	22,422	2	289	1	699	6	2,044	23	833
FY 1988 Estimate	545	23,919	2	266	4	532	11	3,717	30	853
FY 1989 Estimate	568	25,639	2	203	4	482	10	2,951	27	682

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of Natural History/Museum of Man (NMNH/MOM) houses what is probably the largest and most valuable assemblage of natural history specimens and human artifacts in the world. The Museum is actively engaged in the care, conservation and study of these collections. The scientists and scholars conduct original research on living and fossil animals and plants; rocks, minerals and meteorites; and human artifacts to illuminate human biological diversity and cultures, ancient and modern. The Museum shares its work with the scholarly community through publications, symposia, and scholarly exchanges, and with the public through exhibitions, publications and educational programs. The success of the public programs is given ample testimony by the more than six million visitors to the Museum in 1987 -- making it the most heavily visited natural history museum in the world. For FY 1989, an increase of 23 workyears and \$1,720,000 is requested: to continue field studies in biological diversity (4 workyears and \$315,000); to provide enhancement of the molecular systematics laboratory of the Museum (5 workyears and \$650,000); to conduct research on the evolution of terrestrial ecosystems (2 workyears and \$100,000); to strengthen the Museum's collection management activities (6 workyears and \$430,000); to accelerate the renovation of the permanent exhibit halls (4 workyears and \$100,000); to establish a permanent Native American Outreach Program (2 workyears and \$75,000); and to continue planning for the Quincentenary activities (\$50,000).

PROGRAM - The collections of the National Museum of Natural History/Museum of Man, which contain about 100 million specimens of plants, animals, fossils, rocks, minerals and human cultural artifacts, have proven essential to the Nation's scientific community by providing fundamental documentation for the study of man and of the flora, fauna and geology of our planet and outer space. In FY 1987, approximately 800,000 specimens were added to the collections through gifts, purchases, expeditions of Museum scientists, and deposits from other government agencies. The Museum is responsible by law (20 U.S.C. 59) to serve as the ultimate repository for the collections of natural history, archeology and ethnology gathered by United States government agencies. In addition, it provides laboratory

space and research facilities to 80 scientists in affiliated Federal agencies with natural history missions (United States Department of Agriculture, National Marine Fisheries Service, Fish and Wildlife Service, National Institutes of Health, and Geological Survey).

Worldwide Research - Scientific research on the Museum's collections and the publication of scientific findings are fundamental to the mission of the Museum. In FY 1987, more than 2,000 scholars from all over the world used the collections. The Museum's own staff of 113 scientists and 125 resident research associates were engaged in hundreds of collection-based and non-collection oriented research projects. To acquire new information and specimens for this work, members of the staff conducted field research in many countries throughout the world. Among the major FY 1987 expeditions are the following:

--Southeast Pacific: Researchers visited remote, uninhabited Henderson Island, part of the Pitcairn Island group. It is the only elevated coral atoll in the Pacific and Indian oceans that remains relatively undisturbed by human activity. Museum researchers conducted the first modern survey of the Island's unique birds, plants, insects, and other invertebrates, recording the state of the Island as a basis for possible longer-term research.

--Kenya: Museum investigators continued research on early hominoid sites in the southern Kenya rift valley and on Lake Victoria pursuing information about the ecology and activities of early humans from 1.5 million to .5 million years ago. The fossil remains of an extinct form of elephant were excavated.

--Guyana and French Guiana: Museum field collectors collaborated with other major botanical research institutions in the United States, Europe and Latin America in a long-term effort to describe little known plant life. A knowledge of indigenous plants is crucial to the intelligent utilization and conservation of the vast natural resources of the tropical forests of the Guianas.

--Scientists now believe the major center of biological diversity on Earth to be in western and northern Amazonia from the flanks of the Andes eastward onto the Guianas. With the rich habitats of this region imperiled by accelerating development, the Museum is collaborating with international conservation organizations and Latin American nations to inventory and study millions of species of unknown plants and animals before they are lost forever. In FY 1987, the Museum sent biologists to Beni Biosphere Reserve, Bolivia, to launch the first in a series of long term biodiversity surveys that will, among other things, identify species of value to mankind and help protect them from extinction.

Conferences and Workshops - The Museum organizes major international symposia to stimulate and facilitate the exchange of scientific knowledge and ideas, and to provide the public with greater knowledge of important scientific research. In addition, it runs training workshops to provide important assistance to the international scientific community. Among the notable FY 1987 gatherings are the following:

--The Museum staff organized an international conference of paleoecologists to document and synthesize information about the long-term stability of ancient terrestrial ecosystems. The findings will help scientists determine whether contemporary ecological disruptions are extraordinary compared with events that took place prior to the origin of humans.

--An international workshop brought current information to the scientific and conservation community on the marine and terrestrial research and conservation projects conducted by the Museum on Aldabra. This remote atoll is located in the Western Indian Ocean and is a sanctuary for unique plant and animal species, including the only surviving colony of the Indian Ocean giant tortoise.

--Distinguished scholars from the United States and Canada participated in a public symposium at the Museum on "Americans Before Columbus: Ice Age Origins." The discussions provided the public with new perspectives on how and when humans first entered the New World, what kind of people they were, and their adaptation to conditions both during and after the Ice Age.

--Training of 15 Bolivian students participating in the Museum's first Latin America Biodiversity inventory began at the Beni Biosphere Reserve, Bolivia. As the Biodiversity Program expands over the next dozen years, hundreds of host-country biologists and conservationists will be trained by the Museum to develop inventories of species in the terrestrial ecosystems.

Research Publications - Nearly 500 books, major scientific papers, and articles are published every year by Museum scientists. Many of these reports on basic research bear the imprint of the Smithsonian's "Contributions" series. In FY 1987, more than 20 Contributions were issued. These include a dictionary of a Mayan language; a study of the systematics of the crustaceans collected by the 1909-1910 Albatross Philippine Expedition; and systematic papers on bees, ostracods, crabs, fishes, seagrasses, lichens, crustaceans, Egyptian fossil birds, and the geology and paleontology of the Lee Creek Mine, North Carolina.

Collections Management - The National Collections are the cornerstone of the Museum and play an essential role in the Museum's mission and that of the Institution: "the increase and diffusion of knowledge." Accordingly, the Museum is devoting an increasing amount of attention to managing and conserving these collections to forestall any diminution of their scientific or exhibition value. The Museum gives a high priority to developing an automated Collections Information System (CIS) and in FY 1987 set up a CIS prototype system in the Museum's Fish Division. The system makes possible much more effective use of the collections, facilitating scholarly research and increasing the ability of collection managers to maintain accountability over the collections.

Exhibits - Of the many special exhibitions at the Museum in FY 1987, the most notable was "Portraits of Nature: Paintings by Robert Bateman," a major retrospective of works by an internationally respected Canadian wildlife artist. The exhibition drew more than 275,000 visitors during its two and one-half month run and was a major factor in the Museum's record-breaking 1987 attendance. In conjunction with the exhibition, a Museum book about Bateman's art -- explaining its influence on the worldwide conservation movement -- was written by a staff botanist, published by the Smithsonian Institution Press and distributed for sale nationally and internationally.

Two other popular 1987 Museum exhibitions were "The Far Side of Science," an exhibition of 500 cartoons by Gary Larson, and "From Mud to Museum: The Making of a Dinosaur," an exhibition that allows the public to watch museum technicians extract the skeleton of a 220-million year old dinosaur from a ten-ton block of New Mexican

siltstone. The team expects to take as long as two years to unearth, reconstruct, and exhibit the dinosaur.

Under preparation for the fall of 1988 is the major international exhibition, "Crossroads of Continents," a cooperative project involving the United States, Soviet Union, and Canada that will showcase historic archeological and ethnographic artifacts from the people of the North Pacific Rim, from Siberia to southern British Columbia.

The Museum has begun initial planning for a new North American Indian Hall that will explain the diversity and dynamics of Native American life and a new Hall of Human Origins that will present the latest evidence bearing on human evolution.

Education - In addition to providing educational activities, programs, and packets to accompany NMNH/MOM exhibits, the Museum's Office of Education has been actively working with students, families and teachers. The Education staff presented more than three dozen workshops for teachers and museum educators in Washington, D.C. and in communities across the United States. The Discovery Room, a hands-on facility for children, welcomed more than 96,000 visitors during the year. The Naturalist Center, another specialized learning environment, celebrated its tenth anniversary in FY 1987 by welcoming 16,970 amateur scientists, collectors, and artists. The NMNH/MOM Friday Film and Lecture Series presented 39 film programs and 17 lectures during the year. Other educational activities included the following: special programs and activities created in observance of Hispanic and Asian Pacific Heritage Week; an education kit, The Living Arts of India, distributed to universities, museums and schools throughout the United States, and in India through UNICEF; and "Butterflies & Their Flowers," the fourth publication in a new series of instructional charts on plant and animal identification.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 23 workyears and \$1,720,000 is requested: to continue field studies in biological diversity (4 workyears and \$315,000); to enhance the molecular systematics laboratory of the Museum (5 workyears and \$650,000); to conduct research on the evolution of terrestrial ecosystems (2 workyears and \$100,000); to strengthen the Museum's collections management activities (6 workyears and \$430,000); to accelerate the renovation of the permanent exhibit halls (4 workyears and \$100,000); to establish a permanent Native American Outreach Program (2 workyears and \$75,000); and to continue planning for the Columbus Quincentenary activities (\$50,000).

Biological Diversity (4 workyears and \$315,000) - For FY 1989, an increase of 4 workyears and \$315,000 is requested to continue a series of multidisciplinary and integrated biological diversity studies to gain a better understanding of the composition, functioning, and evolution of natural biotas in tropical regions. This request will permit expansion of the existing program to include new sites. Because of mankind's dependence on and continued exploitation of natural resources, no other subject is of greater concern to our future welfare. The biological diversity of the earth is disappearing even before it can be catalogued and studied, and this is especially true in tropical areas. With this in mind, the NMNH/MOM has several new and planned initiatives aimed at gaining a better understanding of the natural biotas in both temperate and tropical regions.

Beginning in FY 1987, the NMNH began collecting specimens and recording the co-existence of botanical, entomological, and other invertebrate species along the arc formed by the western and northern Amazon Basin. National organizations,

researchers and students were enlisted in Bolivia and Peru to join the intensive effort to document the natural history of the area. Hundreds of new plant species, tens of new animal species and tens of thousands of new insect species are on the verge of discovery at present. Smithsonian researchers and colleagues will collect as many of these specimens as possible. These specimens will contribute immeasurably to the reference collections of Latin American universities and museums and to the National Collections of the National Museum of Natural History/Museum of Man. These collections and the studies of them will result in greater understanding of biological diversity, the potential to use these new organisms as food, biological control agents and germ plasm resources. An important aspect of this program is the on-site training of local students by the international cadre of scientists conducting the inventory. These field workshops are vital to cultural and scientific exchange. They have received international attention and ancillary support from the Agency for International Development, World Heritage Program, and the Man and the Biosphere Program at the Smithsonian.

The increase of 4 workyears and \$315,000 will permit the implementation of a student training component to the flora project and a fellowship position at the postdoctoral level to provide expertise not currently available on the NMNH/MOM staff. Additional travel monies will be necessary for trips to foreign herbaria to make comparisons with type specimens; repositories do not loan type specimens. The project also needs a field vehicle to transport specimens from the collection sites to the closest town for processing, as there are no rental vehicles in the region.

The increase will provide four necessary scientific and administrative positions (\$112,000). The research entomologist and research assistant, specialists in tropical insects, will coordinate inventory field activities and study the collections to produce data for analysis. The data will provide an important link between the established scientific complement of the Museum's Department of Entomology and the pan-bureau multidisciplinary program of Biological Diversity studies. The field manager will divide time between the field and the Smithsonian, and will coordinate and facilitate collections and scientific data flow, while the museum technician will identify, label, mount, and accession the incoming specimens into the Museum's collection.

The request for travel (\$81,000) will provide for much-needed additional field work. As sites are chosen and base camps are established, the Museum will have to create spartan housing and laboratory support (\$10,000) in regions so remote that none currently exist. As more sites are added to the program's roster, collaboration with educational and scientific institutions in other countries will increase significantly along with the on-site training of national students. Additional support is required for contracts (\$62,000), shipping (\$6,000), communications (\$1,000), printing (\$2,000), supplies (\$7,000), and equipment requirements (\$34,000). Equipment requirements include one-time costs for a field vehicle, \$20,000.

Molecular Systematics Laboratory (5 workyears and \$650,000) - This request provides enhancement for the second year of the Molecular Systematics Laboratory of the Museum, to establish a permanent, sustainable capability for research in the rapidly developing field of molecular systematics. Building upon the Museum's broad expertise in systematic and evolutionary biology, and incorporating both historical and ecological perspectives, the proposed increase will facilitate the introduction of "state of the art" macro-molecular techniques and methodologies to the largest single group of systematic biologists in the world.

The laboratory will focus on three areas of molecular systematics and evolution. One is that of DNA molecular analysis. DNA molecules are the constituents of genes and may be studied from a number of sources within living organisms (e.g., cellular nuclei, mitochondria, ribosomes) by means of several techniques (hybridization, chemical sequencing). The second area involves the isolating and characterizing biochemical constituents ("natural products chemistry"), especially of plants and lower invertebrates. This not only allows evolutionary inferences to be made, but also the discovery of the structure of naturally occurring compounds of potential usefulness to humans. Finally, the use of electrophoresis investigates the rates at which different characteristic proteins of organisms move apart in an electrical field. This activity is already established on a small scale in NMNH/MOM; it is fundamental to all other more advanced sorts of molecular studies and needs to be expanded.

The request of 5 workyears and \$650,000, which combined with the FY 1988 base of \$450,000, will provide for much of the necessary equipment and supplies required to set up the NMNH/MOM laboratory at the Museum Support Center. The long term annual requirement will be for 26 positions and \$1.4 million. Of the \$650,000 requested, personnel funds (\$156,000) will support two additional scientists and three technicians. The balance of the request will provide for supplies (\$71,000) and equipment (\$373,000), and two post-doctoral fellowship appointments (\$50,000). It is anticipated that all the major equipment will be purchased by FY 1990, and the laboratory will be fully staffed by FY 1991-1992. If the additional funds are not provided in FY 1989, the Museum will not have sufficient resources to support basic equipment and supplies for a functioning laboratory.

Evolution of Terrestrial Ecosystems Program (2 workyears and \$100,000) - For FY 1989, an increase of 2 workyears and \$100,000 is requested for collecting base data on terrestrial ecosystems of the last 400 million years. The data will be used to evaluate the effects of large-scale disturbances on the structure of ecosystems and the evolutionary history of organisms.

Over the past several years it has become clear that impacts from extra-terrestrial bodies and climatic shifts, as well as changes in volcanic activity and continental position, have had major, sometimes catastrophic, effects on terrestrial ecosystems. At the same time, humans are creating global-scale disturbances by such means as tropical deforestation and greenhouse effects, and some of the effects of nuclear war may be analogous to those of large body impacts. The certainty that eventually mankind will face the consequences of man-made or natural catastrophes makes it of paramount importance to understand the history of terrestrial ecosystems and how they respond to such major changes.

The Museum plans to document and analyze the fossil record of terrestrial animals and plants, especially concentrating on intervals before and after extinctions and before the emergence of human influences. This documentation and analysis will be carried out by producing, compiling, and analyzing large computer data bases. The data will be displayed and examined using computer generated maps, then analyzed statistically.

The requested increase will allow the Museum to hire a research assistant and a data entry/administrative assistant (2 workyears and \$53,000), to coordinate data entry, check entries for uniformity, enter data onto the central computer, and manage daily functions. It will also support the enhancement of relational data

bases, graphics, and mapping functions, as well as consultation on specific fossil assemblages through contracts and fellowships for university scholars (\$23,000); the purchase of software for data display and analysis (\$10,000); travel for researchers and student fellows associated with the project (\$12,000); and the purchase of basic supplies and materials (\$2,000).

Through increased interaction with colleagues at other research institutions and universities, a need will exist for additional computer equipment, more research-related travel and consultation, and more student fellowships. Beginning in FY 1991, purchases of computer equipment should decrease substantially, but the flow of visiting researchers and students will continue, and the need for one additional research scientist is anticipated.

Collections Management Support (6 workyears and \$430,000) - For FY 1989, an increase of 6 workyears and \$430,000 is requested to enhance the Museum's ability to fulfill its collections management responsibilities. The continued growth in size and importance of the National Collections of the NMNH/MOM and the concomitant increase in collections use by the research community and the public have begun to outstrip the Museum's ability to adequately care for, provide access to, and be accountable for the National Collections and associated data. In 1986 alone, well over one million objects and specimens moved into or out of the Museum as new acquisitions, loans for exhibit and research purposes, or exchanges.

In addition to the problems surrounding the trafficking of such a large number of collections, other deficiencies exist within the Museum with respect to the condition of storage equipment. The findings of several external review committees, after examination of collections storage, show that the collections are in severe danger of pest infestation and dust penetration, as well as being housed under non-secure conditions due to the lack of adequate locks. Many of the herbarium cases have reached a dilapidated condition and the replacement of these cases is essential to ensure proper preservation of the historically important, valuable and growing collections housed in the Museum. Steady infiltration of dust through the joints of many of the old cases has already damaged many of the specimens. Meanwhile, the loose or sprung condition of a number of these cases constitutes an invitation to more serious damage by insects and other herbarium pests. To correct growing deficiencies NMNH/MOM requests increased support for: additional collections storage equipment; collections and inventory maintenance; and development and enhancement of an improved automated Collection Information System.

Currently, over 75 percent of Museum base funds are devoted to collections management and research functions of the Museum. These two functions are so closely intertwined that total base funding for collections management activities such as processing, evaluating and culling cannot be separated out in any definitive way. Curators, researchers, specialists and technicians, exhibits and education staff, all carry out collections management functions. Over 60 full-time workyears are currently devoted to the broad range of duties associated with collections inventory control and data management; two positions are devoted to design and programming of Museum-wide automated collections systems; and, base funds provide about \$100,000 per year for storage equipment.

A prototype project for the Institution-wide Collection Information System was successfully completed on a small subset of the Museum's collections in May 1987. Further development and implementation of the system will support the efficient

building, maintenance of, and on-line access to the Museum's collection data base, the basis for most of the Museum's research and for researchers worldwide.

The requested increase will allow the Museum to hire two technicians to process collections and aid in inventory maintenance, and four information specialists to aid in the design and programming of the automated Collection Information System (6 workyears and \$187,000). Contract programmers will be used during a portion of the system development phase (\$65,000), and in areas where no staff expertise exists, specialists will be hired to process and evaluate collections (\$40,000). A portion of the collections storage equipment acquired will house new collections, but a larger portion will replace seriously inadequate cases that do not protect valuable collections from pests and dust (\$90,000). Additional computer work stations with necessary software will be required to access the Collection Information System (\$48,000). In FY 1990 and following years, additional collections technicians, both temporary and permanent, will be requested for collections processing and inventory maintenance, as will continued funding for the full implementation of the Collection Information System. Level funding is required through FY 1993 for the Museum's collections storage improvement plan.

Renovation of Permanent Exhibit Halls (4 workyears and \$100,000) - An increase of 4 workyears and \$100,000 will enable the NMNH/MOM to embark on "The Fourth Generation of Exhibits: Building for the 21st Century," a long-term renovation plan for its 30 permanent halls which is estimated to cost \$84 million. The staff and funds requested will assist in continuous upgrading, accelerated renovation, and maintenance to assure the quality of the exhibits and public spaces, the care of the National Collections on display, and the safety and comfort of the visiting public, now numbering more than six million annually. The Native American Hall is one of the exhibits most urgently needing renovation, and the first steps can be taken if this request is approved.

The Museum contains approximately 1,000 individual exhibit units comprising well over 200,000 square feet of exhibit space. With such a large number of visitors per year, the exhibits are subject to rapid and constant physical deterioration, and require virtually continuous repair and refurbishment to uphold Smithsonian standards and to assure the safety of the visiting public. A second goal of the funding increase is to improve the basic visitor experience of the Museum through the improvement of visitor support services and public amenities, which are in need of immediate attention.

Many of the permanent halls in the Museum are more than 30 years old. The increases in staff support and resources made possible by a program increase will not only allow the Museum to maintain and upgrade the physical condition of the Museum, but will also enable the Museum to modernize the existing cases, labels, photographs, and other display items to assure that the most modern and accurate scientific information is presented to the public.

This increase will be added to the Museum's base budget of approximately \$1.6 million for permanent exhibits. Personnel costs for a designer, cabinetmaker and two technicians total \$91,000; the balance of the request will support services (\$6,000); and supplies and materials (\$3,000).

The Museum will continue to request further increases for some years to come for necessary updating. A reduction to this request will seriously compromise the Museum's efforts to renovate and maintain exhibition areas. Even with approval of

these funds, it will be necessary to raise additional funds from the private sector to modernize the Museum's many antiquated halls in a reasonable period of time.

American Indian Outreach Program (2 workyears and \$75,000) - For FY 1989, an increase of 2 workyears and \$75,000 is requested to fund a program director and one technician to administer the American Indian Outreach Program at the NMNH/MOM. The Program is an outreach effort designed to support research by and about Native Americans, to make the resources of the Smithsonian more accessible to Indian people, and to increase cooperation between the Smithsonian and Native American communities throughout the United States.

A program director during FY 1987 was funded jointly by the National Museum of Natural History/Museum of Man and the National Museum of American History, but in FY 1988 by the NMNH/MOM alone. Additional resources are required to make this position and program permanent. The program director regularly meets with visiting Indian researchers and tribal delegations, serves as a liaison between Native American communities, individuals, and groups, and helps to facilitate their access to Smithsonian resources. The Native American Hall in the Museum is tentatively scheduled for replacement, and the program director is a member of the committee charged with creating the master plan for the project. In addition, the program director is currently involved in negotiations concerning the repatriation of Native American human remains and sacred materials, and is actively soliciting Indian visitation and research in the collections with fellowship support provided through the Native American Awards Program administered by the Office of Fellowships and Grants.

Collaborative projects between American Indian scholars and communities and the Smithsonian are one of the priorities of the program, and a pilot project for a Kiowa tribal catalogue is already in place. The tribal catalogue is an exhaustive description of all materials in the Smithsonian collection relating to a particular tribe. The research will be done by members of that tribe, and all objects in the Smithsonian collection attributed to that group will be photographed. While some of the photographs will be printed in the catalogue, one complete set will be given to the tribe and another complete set retained for the Smithsonian. For large collections, such as the Zuni and the Navaho, it is possible that a video disc containing images plus historical data pertaining to a tribe's holdings in general could be produced.

Other cooperative projects could involve traveling exhibitions that would be based on Smithsonian collections and developed in cooperation with the tribes receiving them. In the fall of 1987, an exhibit developed by the Program at NMNH/MOM will complement a larger exhibit at the Renwick Gallery on Contemporary Native American pottery and will illustrate its connections to rich traditions. Both exhibits will include demonstrations by visiting craftsmen and activities to celebrate Native American cultures and explain them to the public.

The American Indian Program has no permanent staff position at this time and a budget of \$1,000. Funds have been temporarily reprogrammed from several sources within the Museum to support the salary of the program director (\$42,000) in FY 1988. The program director's involvement with repatriation negotiations and liaison responsibilities are already in excess of the current full time position. Other planned activities--the tribal catalogue series, the exhibit programs, planning for the new North American Hall, and public programming for the fall--will require research and support activities far beyond the capacity of a single person.

A full-time museum technician (\$24,000) will assist the program director in the research and coordination of activities that are already in place or in the planning stage. A total sum of \$5,000 is requested for travel (\$3,000) and for basic supplies and materials (\$2,000). Photographic expenses for the catalogues are estimated to be \$4,000 per year.

The requests described here would make possible a sustained effort in the development of the program and would put into the hands of Indian communities direct products from the research and collections of the Smithsonian. If funding is denied, the Smithsonian Institution will lose a unique opportunity to forge new ties of collaboration with tribal groups across the land.

Columbus Quincentenary (\$50,000) - For FY 1989, an increase of \$50,000 is requested to continue the Museum's research, planning, and development for its part in the Institution's commemoration of the Quincentenary. With approval of the FY 1988 request, the Museum's base for Quincentenary programs will total \$140,000. This will support one program manager, archeological field work, exhibit research and advisory committee travel, design and workshop support, and two upcoming symposia on Latin American archeology (FY 1988), and on the "Impact of Contact on Native Biotas" (FY 1989).

The NMNH/MOM Quincentenary Program Office is working on four major projects. All of these projects require the cooperation and support of various departments within the Museum as well as other bureaus and offices of the Smithsonian. Working with the program director, a senior historian on the Museum staff, is a Museum steering committee and a distinguished advisory committee composed of scholars from the Smithsonian and the academic community at large. The Museum's exhibition and program plans are the result of new research in natural history fields as well as reinterpretations of already existing materials. This information will be disseminated through public educational programs, exhibitions, publications, and scholarly symposia. Because the subject matter deals more with concepts than objects, the Museum will be employing new and innovative exhibit techniques to heighten the impact of the story. The exhibition and programs will involve and relate to various minority groups, including blacks, Native Americans, and Hispanics.

The requested increase will enable the Museum to continue work to produce a major, temporary exhibition (15 months) for the Evans Gallery, to open October 12, 1991; to produce a major publication on the exhibition with contributions from the advisory committee; to sponsor five symposia in 1988, 1989, 1990, 1991, and 1992; and to offer support to a major archeological dig that is part of a search for the first American.

The planned exhibition, "Seeds of Change," presents the Old and New Worlds as a series of ecosystems into which the "seeds" of change were dropped. Radiating around the globe like the ripple of pebbles thrown into a pond, these "seeds" -- maize, sugar, small pox, potato, and the horse -- have a far-reaching and dramatic impact not only on the people but also the flora and fauna of both the Old and New Worlds.

In FY 1989, the increase of \$14,000 for travel will be used to send staff members to various museums and learned society meetings to learn what other institutions are planning for the Quincentenary, to allow staff members and researchers to visit new, innovative exhibits, to allow for research at other sites within the Americas and England, and to bring symposium participants to Washington,

D.C. In FY 1990 the Museum will be requesting funding for travel at the same level for this program.

Shipping support (\$3,000) will be used to begin bringing artifacts to the Museum for use in the exhibition. Printing funds (\$12,000) will allow NMNH/MOM to begin work on layout design for the catalogue, brochure, and checklist and for the production of "working" photographs to be used by the designer. The increase of \$14,000 for other services includes design fees for work on the exhibit, publicity, promotional material, and educational publications as well as contracts for outside advisors (e.g., an education specialist and conservators). An increase of \$3,000 is needed for supplies and materials. The increase of \$4,000 (\$3,000 base in FY 1988) for the acquisition of collections will be used to purchase from private collectors, print shops, book sellers, etc., engravings, books, and art objects identified as pertinent to the Museum's exhibits.

The total \$50,000 increase is necessary for the Museum's Quincentenary Office to continue its work. Without the funds, the design stage of the exhibit planning cannot begin, the planned symposium cannot be sponsored, and the assistance of outside experts and consultants cannot be sought. A strong base of Federal support is important to attracting additional and necessary private funding.

NONAPPROPRIATED SOURCE OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are derived from a variety of sources, including annual allotments for specific purposes; the Museum's share of net proceeds from the Museum shop, cafeterias and other receipts, such as sale of exhibit brochures; the "By-Word" exhibition explanation system; and tuition reimbursement grants from local universities for courses taught by Museum staff. Program allotments provide support for events related to the opening of new exhibitions, as well as salary and benefit costs for the Director of the Museum. In FY 1987, allotments were provided for emergency costs related to a diving accident off the coast of mainland China; and partial support toward the purchase of an analytical scanning electron microscope for the Department of Mineral Sciences. In FY 1987 and FY 1988, an allotment provided temporary support for a new research program on the evolution of terrestrial ecosystems, documenting the characteristics of ecosystems before and after major environmental disturbances and the emergence of human impacts. Special Purpose funds are used to help finance exhibit hall brochures, the repair and replacement of exhibit hall audiovisual equipment, benches and carpeting, field research, docent travel costs, duplication of human studies films, training of anthropology students, and support for the Anthropological Archives.

Restricted Funds - These funds are in the form of restricted endowments which specify the use of the donation or bequest and of gifts and grants provided by individuals, foundations and corporations for specific purposes. Generally, the funds provide support for a particular exhibition or research project. Among these restricted funds are field-based and laboratory research on the origin of the Nile Delta supported by Texaco, and ecological studies of mangrove swamps funded by Exxon. Other funding is available from an employee's contribution for ethnological research among the Canela Indians of Brazil. The International Union for Conservation of Nature and Natural Resources provides support for the study of threatened Latin American plants. The Museum received funds from the Donner Foundation for the Human Origins Hall. Funds also were received from Mill Pond Press and Cadillac Fairview Corporation toward production of "Portraits of Nature: Paintings by

Robert Bateman" exhibition. Nippon Airways funded the exhibit opening and other expenses related to the Gary Larson exhibit. Funds are being sought for the renovation of the popular Insect Zoo. The Museum continues to seek support from private sources for its planned exhibitions and outreach programs. Currently, funds are being sought for a new North American Indian Hall, a new Human Origins Hall and for upgrading the Gem and Mineral Hall. Fundraising efforts continue for "Seeds of Change," the Museum's Quincentenary exhibition.

In FY 1982, the Museum undertook the management of the Smithsonian Marine Station at Link Port, Florida (formerly called the Fort Pierce Bureau), as an integral part of its marine research program. The Hunterdon Endowment supports oceanographic research at this facility, which offers an unique environment in which to study an oceanographic transitional zone between temperate and tropical biotas. Research focuses on the life history, systematics and ecology of a wide spectrum of plant and animal marine life. Contributing to the research efforts are a resident scientist, Smithsonian visiting scientists, postdoctoral fellows and numerous national and international visiting investigators. Support is also provided by the Seward Johnson Endowment Fund for operation and maintenance of the Johnson-Sea-Link submersible program conducted at the facility by the Harbor Branch Oceanographic Institution (HBOI). Recently a long-term lease agreement was signed between the Smithsonian and HBOI for land upon which a Smithsonian laboratory and residential facility could be constructed. Funds are currently being sought to cover these construction costs.

Government Grants and Contracts - These funds are provided by various Government agencies and departments for special projects which can be conducted at the Museum because of its unique scientific expertise in certain fields. Examples of continuing Government contract support are projects funded by the National Institutes of Health to support bone pathology research; the "Tumor Registry in Lower Animals" project funded by the National Cancer Institute, which facilitates the study of neoplasia and related disorders in invertebrate and cold-blooded vertebrate animals important in human biomedical research; a project funded by the National Science Foundation to process and distribute polar biological specimens and data; and funds to curate material collected during the Bureau of Land Management's outer continental shelf biological sampling program in the Atlantic and Gulf regions.

NATIONAL AIR AND SPACE MUSEUM

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	211	8,792	1	49	42	3,109	2	901	7	542
FY 1988 Estimate	212	9,037	3	236	45	3,301	2	890	7	360
FY 1989 Estimate	220	9,450	3	261	44	3,427	2	622	5	291

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Air and Space Museum (NASM) serves as an international research center and repository for artifacts and documentation related to the development of aviation, space flight and space science. Through its exhibitions, research, preservation/restoration, and education programs, the Museum serves a wide public and scholarly audience interested in the history and technological achievements of aviation and space flight. In addition to its Mall location, NASM maintains a facility for the preservation and restoration of artifacts at the Paul E. Garber Preservation, Restoration and Storage Facility in Suitland, Maryland. For FY 1989, an increase of 8 workyears and \$413,000 is requested to conduct original scholarly research in the history of aviation (2 workyears and \$125,000); provide curatorial support for research in the history of space science and exploration (3 workyears and \$102,000); support the Museum's collections management programs (2 workyears and \$125,000); support expanding education programs (1 workyear and \$50,000); and continue the development of a World Atlas composed of satellite images in commemoration of the Columbus Quincentenary (\$11,000).

PROGRAM - Established by law on August 12, 1946, NASM's role as a national resource for public and scholarly interest in the air and space fields was greatly strengthened by the completion of the current museum building on the Mall in 1976. More than 110 million people have visited the Museum since it opened, making it the most popular museum in the world. NASM's collections consist of more than 300 historic aircraft, 250 spacecraft and extensive holdings of artifacts, papers, photographs, films, microfiche, video disc and technical drawings, which are available for study by interested scholars throughout the United States and abroad.

The exhibition program uses state-of-the-art techniques in design, presentation and equipment to convey the excitement of the subject matter to the visitor. An active scientific program, aimed at understanding both Earth and planetary geology, continues as an important endeavor of the Museum. Active programs in collections management, preservation and restoration of artifacts remain a centerpiece of the

Museum's curatorial efforts. As a public institution, considerable emphasis is placed on the education and outreach activities through lectures, films, planetarium presentations, docent tours and written materials for schools and visitors to the Museum. During FY 1987, the Museum was reorganized to achieve greater balance between research, exhibitions, education, and collections management functions.

NASM maintains exhibits preparation, collections storage and management, and preservation and restoration programs at the Paul E. Garber Facility in Suitland, Maryland. The Museum has restored more than 60 historic aircraft and spacecraft from its collection at the Garber Facility, with the restoration of additional artifacts planned each year. The Garber Facility also presents to the public approximately 90 aircraft, numerous spacecraft and other flight-related objects. During 1987, approximately 30,000 people visited the Garber Facility.

Research - Research provides the foundation of the Museum's efforts as a primary center for the study of the science and technology of aviation, space, and geophysical science. The results of research projects also support the exhibitions, publications, educational, historic restoration, and archival preservation programs. The areas of research undertaken by the Museum staff include the history of space science and exploration; the history of aeronautics; contemporary developments in these fields; and comparative studies of the Earth and other planets using satellite images and data. In addition, the Museum supports two applied research and development programs: the historic preservation of aircraft and spacecraft; and the storage and retrieval of archival and photographic information.

Aeronautics: The new History Book Series which includes scholarly monographs treating various aspects of aeronautical history, reprints of major works currently out of print and translations of major works by foreign authors began in FY 1987. The goal is to attract to the Museum and the Smithsonian Press the highest quality manuscripts produced by scholars working with the Institution.

The Air and Space Bibliography project represents an important joint program with the Space Science and Exploration Department and the Aeronautics Department. When published in FY 1988, this bibliography will become a major source for annotated reference dealing with aerospace history.

Research and writing continue on a number of books to be published in the upcoming fiscal years. These include Edward Steichen and The Birth of Aerial Photography, Igor Sikorsky's Giant Aircraft, U.S. Women In Aviation 1940 - Present, The Boeing 247 and The Wright Flyer.

Exhibitions in the research and planning stage for FY 1988 include "Women in Helicopter Aviation," highlighting the many contributions of women helicopter pilots; and an exhibit dedicated to the United States Customs Service, emphasizing the vital role played by aircraft in contemporary law enforcement efforts of the Customs Service. Also in the research stage is a revision of the Sea-Air operations gallery that will highlight the six major aircraft carrier battles in the Pacific during World War II with a special tribute to the USS Enterprise, the most decorated carrier of the War in the Pacific. A major new gallery on World War I aviation emphasizing the emergence of air power and the use of aircraft as a weapon of war is also being researched.

Space Science and Exploration: The Museum's joint program of research and documentation of the Hubble Space Telescope with The Johns Hopkins University

Science Department will serve as a rich source of research material for historians in the future, and will provide a valuable current record of space technology. Research is also being conducted on the history of scientific research using satellites, the history of the interaction of aerospace and computing technologies, the history of spacesuit technology, weather satellites, and the history of the Soviet space program. The Space Astronomy Oral History Project (SAOHP) has published a catalogue and continues to augment that collection with new interviews. To date, over 350 copies of the SAOHP catalogue have been sent upon request to outside scholars from many different institutions and the interest in the program has resulted in requests to conduct colloquial and instructional sessions on oral history techniques for outside groups. SAOHP is being expanded to cover other aspects of space science. The success of the oral history program has stimulated interest in experimenting with video histories, and has led to the funding of a pilot video history program by the Sloan Foundation. The planned four-year, pan-Institutional program began in FY 1986 with the establishment of a framework outlining the goals of the program. In FY 1987, a large number of interviews were conducted with senior administrators who were key to the development of the Nation's space program. Also established during FY 1986 and enhanced in FY 1987 was the Glennan-Webb-Seamans Fund for research in Space History to support a broad program in historical preservation and scholarship through recognition of important contributions to the Nation's space program.

Earth and Planetary Studies: The Center for Earth and Planetary Studies was established in 1973 to conduct research in comparative planetology and in the development of the Earth's land forms and surface composition by analyzing remote-sensing data obtained from satellites. Research analysis of remote-sensing data uses scientific information gathered by satellites and analyzed by computer to produce geological and topographical studies of areas on the surface of the Earth, the Moon, and other planets. Research projects on satellite remote-sensing of desert fringe regions are geared towards the understanding of the effects of climatic change on surface materials in the Sahelian zone of Africa. Field work has been done in the inland Niger delta of Mali, in western Egypt, and in northern Sudan. By combining recent satellite images with those taken 14 years earlier, researchers are better able to assess the movement of sand and soil degradation that has taken place due to the recent period of drought. Research in mapping and analyzing the origin of surface features on the Moon and Mars continued throughout FY 1987, with funding by the National Aeronautics and Space Administration (NASA).

In FY 1983, NASA designated the Center for Earth and Planetary Studies as a Planetary Image Facility, a repository allowing researchers access to the collections of images of the planets taken by NASA space probes. During FY 1987, researchers from the Smithsonian and other institutions continued to make great use of this facility. Plans are now under way to link the Planetary Image Facilities across the country beginning in FY 1988 so that this valuable information can be easily shared.

Exhibitions - The major gallery "Looking at Earth" (which opened in FY 1986) has received the General Electric Edison Award for Excellence in Lighting Design. This gallery, chronicling efforts to see the Earth from higher vantage points to study Earth's changing surface, from early attempts using birds and kites to the present use of spacecraft and satellites, also marked the first use of interactive video technology for exhibition purposes at the Smithsonian. By touching the screen and picking out an area within the United States, the visitor can view a Landsat photo of their hometown area.

In FY 1987, the spectacular full-scale replica of the Tracking and Data Relay Satellite (TDRS) was suspended in the Space Hall. The TDRS system, which will eventually consist of three satellites and a ground station, has served as NASA's world-wide space communications network since 1983. The Caproni CA9, the first Italian Air Force airplane, went on display in the Early Flight gallery and a completely restored Spad XIII went on display in the World War I gallery. Additional exhibitions completed in FY 1987 include IRAS, the infra-red astronomy satellite, "Into the Sunlit Splendor, the Aviation Art of Bill Phillips" and an update to the "Friendship 7" exhibit in commemoration of the 25th anniversary of the history-making flight of this spacecraft. In August 1987, the Museum became the proud recipient of the Voyager aircraft. This historic aircraft, the first to fly non-stop around the world, is displayed in the Independence Avenue lobby of the Museum.

Exhibitions planned for FY 1988 include the "U.S. Customs Service"; "Taylor Art Show"; "Women In Helicopter Aviation"; and an upgrade to the Sea-Air Operations gallery. Also planned for FY 1988 is the display of the Hubble Space Telescope Structural Dynamic Test Vehicle. This authentic artifact was used for full-scale testing under varying conditions to simulate the effects of space conditions on the space telescope in preparation for its launch aboard the Space Shuttle.

During FY 1989, the Museum's most ambitious exhibition to date, the "Aerospace Computing" gallery, will open. This major gallery, which will trace the development and use of computers in aviation and space, will include such features as hands-on displays for the public to experience, interactive video units, a state-of-the-art theater and a working robotic arm.

In FY 1990, a major new gallery entitled "The Great War in the Air" will open. Emphasizing the use of aircraft as a weapon in war for the first time, this gallery will demonstrate the overall emergence of air power.

Exhibitions are complemented by film presentations related to air and space travel in a specially equipped theater which uses an innovative, high-resolution projection system (IMAX) and a giant screen for extraordinarily realistic effects. The latest IMAX film, "On the Wing," which premiered in June 1986, presents a comparison of natural and mechanical flight featuring a mechanical replica of the flying reptile Quetzalcoatlus northropi. Another recent IMAX film, "The Dream is Alive," featured actual film footage shot by the astronauts on three Shuttle missions. A new film project now being developed, tentatively titled "An Astronaut's Atlas of the World," will include never before seen film footage shot by the astronauts on earlier Shuttle missions, plus numerous still photographs of our beautiful planet Earth, taken from space.

Development of Collections - In FY 1987, the Museum acquired an Arrow Sport A2-60 aircraft (a 1928 depression-era, two-seat biplane built for the general aviation market which is still in exhibit and flying condition); a Nelson PG 185B Hummingbird airplane, the first sailplane of a series that did not have to be towed into the air by another aircraft; a Vought RF-8G Crusader aircraft (the last Crusader aircraft decommissioned from U.S. Navy service); a De Havilland Chipmunk aerobatic aircraft; a collection of memorabilia donated by Brigadier General Charles E. Yeager, USAF (Ret.), consisting of 200 items ranging from uniforms, medals, trophies, and personal memorabilia; a collection of nine aircraft engines from numerous sources and manufactures, including an Avco Lycoming high bypass

engine, Rolls-Royce Conway, Derwent, and Viper engines, Wright Ram Jet RC2-60 engine, and Pratt and Whitney J60-R6 and TF30P-6-E engines; and a piece of the original fabric from the Curtiss NC-4: the first aircraft to fly across the Atlantic.

In FY 1987, important astronomical artifacts acquired included the Hubble Space Telescope Structural Dynamic Test Vehicle (a high quality mock-up that was used from 1972 to the present to develop and evaluate the design of the Hubble Space Telescope and its handling procedures); a collection of awards and memorabilia of Michael Collins (one of the astronauts who flew on the Apollo XI mission and who later served as the director of NASM from April 1971 to April 1978); Memorial Plaque, 51-L (a flag and mission emblem patch recovered from the Shuttle Challenger after the explosion); and a Space Shuttle Remote Manipulator System (a non-flight mechanical arm similar to those used on shuttle spacecraft to deploy and retrieve satellites). Additional space artifacts are continually acquired from NASA missions.

To date, NASM has acquired 10,000 feet of duplicate footage of original aviation newsreel footage produced by the Movietone News Company from 1919 to 1939, covering topics such as Charles Lindbergh and his Lockheed Sirius, the Spirit of St. Louis arriving at the Smithsonian Institution, Jack Northrop and the original flying wing and the Women's Air Derby of the late 1920s. This extremely valuable footage (part of the collection of 800,000 feet of Movietone newsreel film on aviation currently owned by the University of South Carolina) was produced on nitrate film. Under the terms of an agreement signed with the University in FY 1986, the Museum will retain a master negative and duplicate positive film copy of any nitrate film footage transferred to safety film, and return a positive copy to the University for their collection. The goal is to save all of this historically valuable material for future generations.

Preservation and Restoration of the Collections - Restoration is continuing in FY 1987 on the Arado 234, the first jet bomber, and the OS2U Kingfisher, which was carried on battleships and cruisers and used on aerial reconnaissance missions. Planned for restoration in FY 1988 are the Fowler Gage Tractor; a wooden aircraft built in 1912, the Enola Gay B-29, ATS-6 applications Satellite and the Hubble Space Telescope Model. The treatment program initiated in FY 1983 to reduce further deterioration of aircraft remains the heart of the restoration program.

The Space Science and Exploration Department's Artifact Preservation Group has completed its fifth year of providing information and guidance in the areas of artifact preservation, exhibition, care and handling. This program has created an awareness of the special problems related to space artifacts that were designed and constructed based on a one-time use in zero-gravity environments without oxygen and were not intended for extended storage or display on the Earth's surface. In FY 1987, a one-day workshop was conducted on the packing and crating of museum artifacts for shipment. This workshop featured Blues Farley from The Philadelphia Museum of Art and benefited many organizations throughout the Institution.

Video Disc Project: This preservation program for archival photographs and other visual collections consists of filming the images on 35mm film and the transfer of this film onto video disc format. Currently, over 500,000 images have been transferred and five discs completed. The fifth disc, completed in FY 1987, contains NASA material including 70mm color photos taken from the Space Shuttle. By facilitating greater access to the collection and eliminating the loss or

destruction of the originals, this project has expanded the availability of these vast collections to scholars throughout the world.

Development of the System for Digital Display: Utilizing the most advanced technological innovations in computer and video technologies, the Museum has successfully put together the first three production systems. The ability to translate any historical document into digital format and produce a printed copy of the text has already been tested. The digitizing of the Von Braun papers in Huntsville, Alabama (undertaken as the pilot project), was successfully completed. In FY 1987, the papers of James Webb, Administrator of NASA from February 1961 to October 1968, were digitized at the Truman Library in Kansas City, Missouri.

The Visual Inventory Control (VIC) system developed in FY 1986 and used to digitize a three-dimensional object or picture in full color with high resolution and an accompanying text will be used for inventory management both in the Museum on the Mall and at the Garber facility.

Public Education and Orientation - The Museum's educational programs continued to expand in FY 1987. With the addition of two new education specialists, the development of the Education Resource Center began. This center, modeled after NASA's Teacher Resource Centers and with NASA's support, will provide slides, video tapes, photographs and written materials to educators on aerospace related topics. Numerous educational workshops for teachers were held throughout FY 1987 covering such topics as Weather, Astronomy and Manned Spaceflights. Curriculum materials for "Looking at Earth" and "On the Wing," and a Space Shuttle Activity Book were also completed in FY 1987. A teacher advisory board will meet at the Museum in late FY 1987 as will members of the Regional Resource Program.

The Office of University Programs was created in June 1985 to support the academic focus of the Museum. In FY 1986, the cooperative program between NASM and New York University completed its second year, bringing History of Science undergraduate students to the Museum to conduct a portion of their course work and receive hands-on experience working with museum artifacts. Expansion of this program includes liaisons with The Johns Hopkins University, Cornell University, the Massachusetts Institute of Technology, and Wellesley College. During January 1987, Museum curatorial staff conducted a two-week course on the history and principles of flight for 15 Wellesley students, using the collection as a teaching tool. University cooperative programs have expanded in FY 1987 with a grant from the Sloan Foundation for the development and presentation of a workshop and videodisc and curriculum packages for liberal arts colleges and universities.

Air and Space/Smithsonian magazine was launched in FY 1986 as a bimonthly publication. The magazine was founded by the Museum to provide an educational and informative forum for broad issues on aviation and space topics for the lay public. Market research over a period of months indicated a higher than average appeal for a magazine of this type, and the renewal circulation continues to prove promising. It is planned to eventually make Air and Space/Smithsonian a monthly magazine.

NASM continues to present numerous series of free lectures, seminars, symposia and films to the public. These include the General Electric sponsored aviation lecture series, which in FY 1987 included Brig. General Charles E. Yeager, USAF (Ret.); Top Gun Commander Rick Ludwig, USN; Harold Pareti, founder of Presidential Airways; Col. Steve Ritchie, the only Air Force ace since the Korean War; and Air Vice-Marshal Ronald Dick, Royal Air Force, who lectured on the night bombing raids

over Europe. The 10th annual Von Braun Memorial lecture in May 1987, "Outward Bound: The Extraterrestrial Century," was presented by Dr. Thomas O. Paine. The Charles Lindbergh Memorial lecture was given by Lt. General Benjamin O. Davis, Jr., USAF (Ret.). Other highlights in FY 1987 included a symposium "Messages from the Universe" and lectures by Pierre Clostermann, a Frenchman in the R.A.F., and Senator John Glenn, commemorating the 25th anniversary of his flight in "Friendship 7." The Exploring Space Lecture Series included such topics as "Star Formation and Stellar Demise"; "Born in the Milky Way"; "A Universe of Galaxies"; and "Extragalactic Violence: Quasars in the Distant Universe." The film series continued in FY 1987 showing some very popular movies including "TopGun," "The Right Stuff," "The Bridges at Toko-Ri," "Twelve O'Clock High" and "The Dawn Patrol."

Publications - In FY 1987, the Museum published The Wright Flyer: An Engineering Perspective and Focke Wulf 190: Workhorse of the Luftwaffe. Planned publications in FY 1988 include The Air and Space Bibliography; Boeing 247, part of the famous aircraft series; U. S. Women in Aviation: 1940 - Present; Clothing for Exploration: A History of Space Suits; The Explorer Balloon; and the Research Report. Plans are underway for the following publications in FY 1989: Igor Sikorsky's Giant Aircraft; 1903 Wright Flyer, part of the famous aircraft series; Soyuz 19; and Apollo 11: The Spacecraft and Its Mission.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 8 workyears and \$413,000 is requested to conduct original scholarly research in the history of aviation (2 workyears and \$125,000); provide curatorial support for research in the history of space science and exploration (3 workyears and \$102,000); support the Museum's collections management programs (2 workyears and \$125,000); support expanding education programs (1 workyear and \$50,000); and continue the development of a World Atlas composed of satellite images in commemoration of the Columbus Quincentenary (\$11,000).

Historical Research - Aeronautics (2 workyears and \$125,000) - For FY 1989, an increase of 2 workyears and \$125,000 is requested to supplement existing areas of expertise in the Museum's Aeronautics Department and to enhance current ongoing research projects through the hiring of two senior level curators/historians in the areas of avionics and the history of technology (2 workyears and \$100,000). This increase represents the first phase of a planned program to enhance the Department's research capabilities.

The avionics and instruments collections are very important to the Museum's mission of preserving the technology of the aircraft that shaped aviation history. (Avionics is the science and technology of the application of electronics to the fields of aeronautics and astronautics.) A senior level curator/historian is needed to care for these collections; negotiate donations, trades and loans to enhance the collections; and perform original research resulting in scholarly monograph and journal articles.

The Aeronautics Department also needs an additional historian of aviation technology to keep up with the very rapid military and commercial developments in the field. Progress has been so rapid that a senior historian is urgently needed to record and publish on the advances being made.

In addition, increased funding is requested to support the Department's research support costs, including the purchase of computer equipment (\$15,000) and travel (\$10,000). In FY 1990 and following, it is anticipated that additional

staff and support funding will be requested to continue to reinforce the Department's research capabilities.

This enhancement of the Department's research support, part of the Museum's efforts to achieve greater balance between research, exhibitions, education, and collections management functions, will reinforce the Department's current efforts to upgrade its research capabilities. For instance, the research conducted for the new World War I Gallery, "The Great War in the Air," will focus on the social and cultural impact of the world's first experience with global war. This research which will trace the development of aerial strategy and tactics--some of which is still in use today--will study the lasting impact of the first World War and its monetary, manpower and psychological costs to society. Other recent research projects include the complete documentation of the history of the Wright Flyer, resulting in a definitive publication that will include valuable information found during the recent restoration of this historic aircraft; and research on the Boeing 247, tracing the history of the first modern airliner and the emergence of commercial aviation in the 1930s, which will also be published.

The Museum's increased emphasis on research will strengthen its ties with other academic and museum enterprises, both domestic and foreign, in common areas of interest. Without these additional funds, large gaps in these areas of expertise will continue to hamper the Aeronautics Department's historical research and planned research for upcoming exhibitions, such as "The Great War in the Air."

Historical Research - Space Science and Exploration (3 workyears and \$102,000)

The Space Science and Exploration Department is currently involved in the research and development of the Aerospace Computing Gallery, which will trace the historical development and use of computers in aviation and space, and the ongoing oral history program. Through the oral history program, the Museum continues to conduct and catalogue interviews with senior administrators and other important figures involved in the space program. The success of the oral history program led to the funding of the innovative video history program by the Sloan Foundation. This pan-Institutional pilot program will capture for posterity interviews with influential participants in the Nation's space program. The Department is also involved in documenting and restoring its vast space artifact collection, including the preparation of artifacts for loan to other educational institutions around the world. Other research projects include the history of the manned and unmanned space flights, the history of Russian space exploration, and the social and technological impact of space science.

All of these research projects place tremendous demands on the curatorial staff, requiring the need for additional staff support to assist them with their other curatorial responsibilities, including collections management, exhibitions, and public education. For FY 1989, an increase of 3 workyears and \$102,000 is requested in support of the curatorial staff so they may be partially relieved of the more routine collections management, oral history and public service duties. The requested increase would allow the Museum to hire two additional museum technicians (2 workyears and \$58,000) to handle collections management, oral history and public service responsibilities of the Department and a secretary (1 workyear and \$21,000) to handle the increased clerical workload generated by the expanding research programs of the Department. In addition, increased funding is requested for research materials such as scientific journals and books (\$10,000), and for research travel costs (\$13,000). In FY 1990 and following years, it is anticipated that additional curatorial positions and funding for travel and the

purchase of research materials will be requested to continue to support the Department's expanding research programs.

Collections Management Projects (2 workyears and \$125,000) - A new Collections Management Division was established as the result of the Museum's recent reorganization. One major goal of this new division is to gain better physical and intellectual control over its document and audio visual collections through implementation of a formal archival program. This effort is compatible with the Secretary's emphasis on applying modern technologies and methodologies to collections management, conservation and preservation programs. NASM's archival program will benefit the Museum's research efforts as well as those of the greater research community by providing improved access to the collections.

For FY 1989, an increase of 2 workyears and \$125,000 is requested to support a number of important collections management programs throughout the Museum. They include locating, surveying and describing the vast archival collection, equipment and materials necessary to initiate our conservation program, equipment for participation in the Institution-wide automated Collection Information System (CIS), and conversion of the film collection to a long shelf-life format.

The Museum's document collections (which occupy approximately 9,000 cubic feet of storage space) must first be surveyed and described. Finding aids and indexes must be prepared, and an on-line data base system developed. This work will require an additional museum technician (1 workyear and \$29,000) beginning in FY 1989.

The pace of the Museum's successful program to preserve its collections of photographs, drawings and documents by converting them to machine-readable formats will increase with emphasis on those collections in the most advanced stages of deterioration. An additional museum technician (1 workyear and \$19,000) is requested to support this project.

As part of the Museum's effort to conserve its collections properly, a conservator will be hired from base resources in FY 1988. To implement this conservation program, additional funding is requested for FY 1989 to purchase specialized conservation equipment (\$30,000) and conservation supplies and materials (\$12,000).

The Museum's plan to participate in the Institution-wide automated Collection Information System will require funding of \$15,000 to purchase computer equipment compatible with the Institution's mainframe computer. It is essential that the Museum participate in this program, since it will allow for centralized location of all Smithsonian artifacts. Currently Museum staff members are serving on the committees developing CIS policies and procedures for implementing the new system.

The majority of the Museum's historical film collection is stored on metal reels in metal cans, which cause rapid deterioration. The request for \$20,000 in FY 1989 will be used to save a significant percentage of these irreplaceable and historically valuable films by transferring them to plastic reels and cans. This funding will also allow the Museum to make duplicate copies of selected portions of the aviation newsreel footage produced by the Movietone News Company (the footage is currently owned by the University of South Carolina), as needed for NASM's research and other programs. Through an agreement with the University, NASM can acquire, for its collections, a master negative and positive film copy of the original nitrate film footage in exchange for transferring it to safety film.

In FY 1990 and following years, it is anticipated that additional funding will be requested for an additional museum technician position and computer equipment to upgrade and improve the artifact loan program and artifact record keeping system and to convert the Museum's nitrate film collection to safety film. Additional funding to convert the Museum's film collection to safety film is also being sought from outside funding sources.

Without these additional resources, artifacts, documents and films will continue to deteriorate. The Museum's vast archival collections will remain largely unavailable to researchers for many years.

Education Specialist and Related Support (1 workyear and \$50,000) - For FY 1989, an increase of 1 workyear and \$50,000 is requested to support the expanding educational programs in the Museum, including the Regional Resource Program, teacher workshops and related education curriculum development.

The Museum's goal to expand educational programs while also promoting and encouraging teacher utilization of the Museum's collections and resources will be well served by this increased funding. In conjunction, the Secretary's emphasis on increasing the diversity of adult audiences through educational activities will also be accomplished.

Since FY 1987, the teacher workshop program has proved successful by full enrollment, teachers returning for additional workshops and implementation of college accreditation. Workshop topics included "Remote Sensing," "Weather in the Classroom," "Basic Astronomy," "Planets and the Moon for Primary Teachers," and "Flying; Pterosaurus, Wright Brothers to Now." Each session accommodated 25 teachers, attracting participants from the metropolitan area and as far away as Delaware and Pennsylvania. The Regional Resource Program, which draws educators from across the country and provides them with training and educational materials on various aerospace subjects and the NASM collection, requires participants to share the educational materials and information on the NASM collection with teachers, students and groups in their local community. This successful program will be expanded to include more participants, topics, and cover a larger geographic area.

The requested increase would allow the Museum to increase and expand these programs by hiring an education specialist (1 workyear and \$29,000) and provide funding for educational materials, lecturers and travel for participants in the Regional Resource Program (\$21,000). In FY 1990 and following years, it is anticipated that additional funding will be requested for materials and lecture fees for the teacher workshops and travel funds for the participants in the Regional Resource Program.

The lack of these additional funds will eliminate the expansion of these important educational programs. Fewer educational materials will be developed and distributed to the educational community and the initiation of a greater museum education outreach program will be hampered.

Columbus Quincentenary Program (\$11,000) - For FY 1989, a total of 1 workyear and \$47,000 (an increase of \$11,000 over the FY 1988 base level of 1 workyear and \$36,000) is requested to continue the development of a World Atlas composed of satellite images in commemoration of the Columbus Quincentenary. Publication of

such an atlas will enhance the public understanding of satellite remote sensing, increase and diffuse the advances in geographical and physical knowledge of the Earth gained through manned and unmanned space missions, and provide a major reference work on world physiography and natural features. The production of this atlas as a Quincentenary program underscores the importance the science of cartography played during the age of exploration and the way that current advances in state-of-the-art technology continue the search to expand knowledge of the geographic world. This project will facilitate the strengthening of the Museum's ties with other academic enterprises around the world in the field of remote sensing while also producing an appropriate permanent commemorative document for this important international historical anniversary. The Atlas would be a major contribution to the proposed International Space Year (1992).

With funding provided in FY 1987 and requested in FY 1988, the Museum began the background research and planning to produce the Atlas using remote sensing information from Landsat, SPOT (the French SPOT remote sensing satellite), and other imaging satellites. The atlas will provide an unparalleled reference for research by providing the synoptic view of geographic and environmental features that only satellite images can provide. In addition to the primary atlas, a second volume is planned that would consist of a user's guide and information about the various types of remote sensing information available, as well as a description of the sensor characteristics (multispectral, radar, film, camera systems, etc.). At present, this information is scattered throughout the scientific literature, with no single source or coherent explanation that is widely available to the public.

During FY 1988, the Museum plans to hire a project coordinator to continue background research and provide liaison with other agencies involved in satellite remote-sensing research, including NASA, the National Oceanic and Atmospheric Administration, the European Space Agency, EOSAT Corporation and SPOT Image Corporation, as well as both satellite remote groups and other international organizations. The requested increase for FY 1989 will be needed for additional support costs as the work progresses, including travel, supplies, duplication of images, and enhancement of computer equipment.

Without these additional funds, the Atlas would be limited to only selected areas and would duplicate already existing publications. Its use as a research and educational tool would be greatly diminished.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are derived from a variety of sources including the Museum's share of the net proceeds from the shops and restaurant, the net proceeds resulting from bureau activities (such as the Theater and Planetarium) and small allotments. In addition to meeting expenses of the Theater and Planetarium, these funds are used to finance fellowships, research chairs, guest lecturers, symposia and special events. A portion of the proceeds from the Theater and Planetarium provide particular support for the production of new IMAX films including "The Dream Is Alive" and "On the Wing," as well as other Institution programs. Supplemental outside funding was received for both new films. In the Albert Einstein Planetarium, the Museum premiered a new show in FY 1987, "State of the Universe." Continuing support is also provided for distinguished scholars to study at the Museum through the Lindbergh Chair of Aerospace History, The Chair in Space History and the International Fellowship. Other

fellowship programs include Guggenheim and Verville, which support pre- or post-doctoral students and other distinguished scholars in aviation and space science.

Restricted Funds - Funds provided here are in the form of restricted endowments which specify the use of donations or bequests, and of gifts and foundation grants by individuals, organizations or corporations for specific purposes. Examples of these funds are the Ramsey Endowment, which finances research relating to naval flight history; the Guggenheim Endowment, which is used for lectures and stipends; the Martin Marietta Chair in Space History which supports research by distinguished scholars in the space sciences and the NASM Educational Fund. The Sloan Foundation provided grants in FY 1986 to support a four-year video history program, as well as to support a workshop, videodisc and curriculum package on aviation history. Numerous corporate donations, both monetary and "in kind," to support the "Aerospace Computing" gallery were received in FY 1987 and have been pledged for FY 1988. Seed money for the newly-established Glennan-Webb-Seamans Fund for Research in Space History was received in FY 1987 from corporate sources.

Government Grants and Contracts - These are provided by various agencies and departments for special projects which can be conducted at NASM because of its expertise in a given area. Continued funding from the National Aeronautics and Space Administration grant program supports the following research activity in planetary geology by the Museum's Center for Earth and Planetary Studies: photo-geologic investigation of planetary tectonic features, the structural geology of the Basalt Plains and the Planetary Image Facility. The research project on satellite remote sensing of central Mali, which was begun in FY 1984, continues to determine the long-term effects of climate change on the fragile environment of the inland Niger delta region. This research was expanded in FY 1985 to cover fringe areas of the world's deserts and will receive continued financial support. The Space Telescope Historical Project, a joint effort between The Johns Hopkins University and NASM, also is partially funded by NASA and will complete its planned publication in FY 1987.

NATIONAL MUSEUM OF AMERICAN HISTORY

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	316	13,339	2	188	3	635	10	2,000	3	90
FY 1988 Estimate	330	13,648	2	198	3	568	6	3,816	--	5
FY 1989 Estimate	336	14,242	3	201	3	618	5	2,418	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of American History (NMAH) collects and preserves the Nation's material culture, the artifacts that embody the national heritage of the United States. By carefully enlarging and preserving its collections and using them as a basis for exhibitions, educational programs, research, and publications, the Museum offers scholars and the public the opportunity to study the history of the United States from a unique perspective. In addition to the Mall building, the Museum maintains the exhibition "1876 Centennial," located in the Arts and Industries Building, and supervises the movement and care of objects stored in six buildings in Suitland, Maryland. For FY 1989, an increase of 6 workyears and \$594,000 is requested to support the Museum's long-range Exhibition Reinstallation Program and provide for Master Plan related electrical work (\$200,000); to prepare and convert collections management data for migration to the Institution's new IBM/INQUIRE system (3 workyears and \$215,000); to support the Museum's plans to commemorate the Columbus Quincentenary (1 workyear and \$45,000); to fund additional conservation support of collections and exhibitions (1 workyear and \$60,000); to provide administrative and research support to the Museum's American Indian Program (1 workyear and \$24,000); and to fund the rental of commercial storage space to accommodate collections displaced by the Museum's Exhibit Reinstallation Program and Master Space Plan (\$50,000).

PROGRAM - The National Museum of American History possesses the largest and most diverse collection documenting the political, cultural, scientific, industrial, and military development of the United States. Covering a wide spectrum of materials, sizes, and descriptions, these museum objects include railroad trains, automobiles, textiles, photographs, paintings, sculpture, paper materials, clothing and costumes, tools, power machinery, clocks, weapons, ceramics and glass, musical instruments, scientific instruments of all kinds, one million numismatic specimens, and 14 million stamps. The Museum preserves and protects this irreplaceable "history book of objects" through a strong ongoing collections management program that includes proper storage, conservation, registration, and archival functions.

The Museum is now engaged in a dynamic ten-year Exhibition Reinstallation Program, which will reshape the way in which these collections are interpreted and presented in NMAH's exhibition halls. Through exhibitions, research publications, and an array of lectures, symposia, concerts, tours and demonstrations, and film and broadcast features, NMAH presents the unique cultural and scientific heritage of the United States to more than five million visitors per year.

Exhibitions - For several years the Museum of American History has been planning the integration of two major programs in its attempt to renovate the physical plant of the building while reinterpreting the collections of the Museum in new exhibition halls. These two programs are known as the Master Space Plan, which addresses the physical rehabilitation of the building itself, and the Major Reinstallation Program.

The Major Reinstallation Program began almost six years ago. A great deal of planning, research, and reorganization of staff has resulted in the successful completion of the first two major permanent exhibitions under this program. "After the Revolution: Everyday Life in America 1780-1880" opened in November of 1985, followed a year later by the exhibition, "Engines of Change: Industrial Revolution in America 1790-1860."

Major planning is underway at the West end of the building as the Museum proceeds with the first phase of a multi-year program leading toward the opening of the "Information Age" exhibition scheduled for 1990. Demolition for this work will begin in October of 1987. Three other exhibitions planned for the West end are: the Quincentennial exhibition tentatively entitled "America's Beginnings," an exhibit on "Music in America," and the "20th Century Life in America" exhibit.

Major changes are planned for the two most popular attractions. In the summer of 1987, the Pendulum will be removed and will remain off view for approximately four months while demolition and construction work is done in preparation for the opening of "A Material World" in the spring of 1988. This exhibit will explore the world of materials and how they are used by man. The "First Ladies Hall" will close the day after Labor Day (September 1987) and remain off view until approximately 1991 when it will reopen in a new space on the second floor. In the interim, a small exhibition will display a few decorative accessories and the gowns of living First Ladies.

In September of 1987, the first of five small experimental/exploratory exhibitions will open for the forthcoming Quincentennial celebration in 1992. The first, titled "Drake's Bay," will open in a small gallery area adjacent to the Star Spangled Banner Hall on the second floor.

Other major exhibitions planned for the future are: a Bicentennial of the Constitution exhibit, "A More Perfect Union," scheduled to open in October 1987; "Search for Life," an exhibition about the subject of genetic engineering opening in November 1987; and "Ceremonial Court," a 1902 renovation of the White House, opening in December of 1988. In 1989, the exhibitions, "Men and Women: Dressing the Part," a costume exhibition, will explore the issue of gender roles, and "Parlor to Politics" will illustrate women's contributions to American social and political movements.

Collections Management - In FY 1987, the Museum continued its active loan program, borrowing approximately 1,700 and lending 3,000 objects from the

collections, with an insured value of over \$15 million. The Museum continued to make progress on the maintenance of automated and manual documentation of its collections of over 16 million objects. This work will prove invaluable to the Museum's efforts to respond to over 100,000 requests made by the public annually for information about the collections and will improve management control over the Museum's holdings, which increased by more than 100,000 objects in FY 1986. The Museum has incorporated the inventory function into a more comprehensive collections information system, which includes object accessioning, cataloguing, loan processing, and tracking movement of collections and deaccessioning.

To address the immediate need for additional storage space caused by current renovation work to the American History Building and the ten year reinstallation of the Museum's major exhibitions, the Museum began moving objects into 8,000 square feet of space at the leased Radiation Biological Laboratory (RBL) in Rockville, Maryland in FY 1987. Additional leased space will be necessary, especially since the RBL lease expires at the end of calendar year 1989 and cannot be renewed.

Conservation - In FY 1987, the NMAH continued its major program to survey the condition of its collections and to accelerate the immense task of treating the backlog of objects now known to be deteriorating or imperiled by outdated and environmentally unsafe storage and exhibit conditions. Over 20 percent of the two million objects in the collections are now estimated to be in serious need of stabilization or rehousing. Over 7,200 of these objects were treated or rehoused during the current year, and over 1,500 objects were surveyed or treated in support of current exhibitions and loans, with textiles and costumes receiving special attention. A Disaster Plan for the protection of collections was completed, which involved forming emergency teams and placing disaster supply carts at appropriate locations in the Museum.

Archives - In FY 1987, the Archives Center of NMAH gave major attention to the anticipated acquisition of the Edward K. (Duke) Ellington Collection of musical manuscripts and related historical materials. Working closely with colleagues in the Division of Musical Instruments, Archives Center staff members conducted an initial survey of the collection and began planning to preserve this extraordinary collection so that it will be accessible to scholars and to a broad American public through publication and exhibition.

Suitland Facility - In FY 1987, the Museum continued the asbestos cleanup program begun in FY 1985, to make the more than one million objects from the Museum's collections stored at the Institution's Suitland facility accessible and to reduce the potential health hazard to staff working with those collections. In FY 1986, Building 18 was cleaned. The renovation of Building 19 and ongoing cleaning in Building 15 will be completed in FY 1988, after which about half of the facility's storage capacity will have been cleaned and treated.

Museum Support Center - In FY 1986, the Museum began formal planning for the move of collections from several of its curatorial divisions to the Museum Support Center (MSC). Two members of the Museum's staff were assigned to act as project to manager and part-time coordinator, and a planning committee was formed to establish a working relationship with the Museum of Natural History's move staff.

Collections Acquisition - In FY 1987, the Museum received numerous significant objects through purchases and gifts. These acquisitions include: a rare wooden printing press of the type used in 18th-century America; sound and rhythm

synthesizers with an electronic keyboard and a speaker-amplified unit that illustrate what a composer-performer of the late 1960s would have had in a studio; 11 unusually fine Pennsylvania-German fraktur from the 18th and 19th centuries, including birth and baptism certificates and writing specimens; uniforms, badges, handbooks, and other items related to the Girl Scouts of America from 1912-1986; artifacts and archival material owned by Alice Paul that pertain to the suffrage and Equal Rights Amendment movements; leaflets and broadsides, principally in Japanese, prepared by the United States Office of War Information and by the Japanese government for circulation behind enemy lines in 1944 and 1945; a collection of transistors and other items that represent the field of microelectronics in the period between about 1957 and 1970; a Jarvik-7 artificial heart used in surgery in 1985; the final plaster models by the artist James Earle Fraser for the obverse and reverse of the Buffalo nickel, dated 1912; and a screen wagon of the type introduced at Sherman, Texas, in 1886 for transporting mail more securely.

Public Programs - Over the years, the Museum has widened its educational outreach program through initiatives directed toward minority audiences. During FY 1987, the Department of Public Programs developed new educational activities, performance programs, and publications in conjunction with the reinstallation of the Museum's major exhibits, and launched a new series of public programs in conjunction with the Columbus Quincentennial. It continued to produce programs such as the Program in Black American History, the Chamber Music Program, the Saturday Afternoon Series, the Palm Court Series, and the Bandstand Series.

Some highlights from FY 1987 include: a two-day public conference, Race and Revolution: African-Americans 1770-1830, at which scholarly presenters elucidated some of the topics presented in the exhibit "After the Revolution"; a new series of free public programs, American Sampler, that explores the 18th- and 19th-century musical heritage of blacks, Native Americans, and working class Americans; a pilot series of public programs on the role of Hispanic culture in shaping the American experience which, if successful, will become part of the Columbus Quincentenary Program; and new visitor activity centers, in the Museum's "Engines of Change" and "A More Perfect Union" exhibits, developed by the Division of Education and based on the Museum's experience with the Hands on History room.

Research - The Division of Transportation continues its basic survey of the U.S.S. Indiana artifacts, including the earliest propeller-driven ship's machinery ever recovered, while the artifact collections of the Department of the History of Science and Technology continue to support a wide variety of research projects. A sampling of recent collections-related research includes the use of technology collections to document patterns of economic, social and technical change such as: the contribution of American clockmakers (particularly the Bond family) to the field of astronomy; everyday life of the American soldier, as well as a study of the role of nurses in hospitals; and ways in which computers are changing social structures (in conjunction with the major exhibit, "Information Age").

Research resulted in important publications in FY 1987, including Pete Daniel's award-winning book on agriculture in the New Deal Era, Breaking the Land; Robert Post's book, Streetcars for the Angels: Electric Street Railways in Los Angeles; and Spencer Crew's, Field To Factory: Afro-American Migration 1915-1940.

In FY 1987, the National Museum of American History opened an Office of Academic Programs with funds reprogrammed within its base budget. The Office is responsible for coordinating the Museum's many relationships with colleges and

universities and for overseeing the Museum's fellowship programs. In January 1988, it will become the editorial home of the American Quarterly, the journal of the American Studies Association. In addition, the Museum's commitment to the journal, Technological Culture, has been renewed for five more years. This effort was undertaken to strengthen joint programs and ties with other academic enterprises in areas of common interest.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 6 workyears and \$594,000 is requested to support the Museum's long-range Exhibition Reinstallation Program and provide for Master Plan related electrical work (\$200,000); to prepare and convert collections management data for migration to the Institution's new IBM/INQUIRE system (3 workyears and \$215,000); to support the Museum's plans to commemorate the Columbus Quincentenary (1 workyear and \$45,000); to fund additional conservation support of collections and exhibitions (1 workyear and \$60,000); to provide administrative and research support to the Museum's American Indian Program (1 workyear and \$24,000); and to fund the rental of commercial storage space to accommodate collections displaced by the Museum's Exhibit Reinstallation Program and Master Space Plan (\$50,000).

Exhibit Reinstallation/Master Space Plan (\$200,000) - The Museum is heavily committed to a joint funding program to accomplish the revitalization of the physical plant of the Museum in conjunction with the Major Reinstallation of its exhibitions. To accomplish the program goals successfully, the Museum requires a minimum of two million dollars. An amount of one million dollars is budgeted from the Museum's base account, with the remaining one million dollars coming from fund raising from private sources (corporate sponsors) in conjunction with the Master Space Plan R&R funding.

An important area of need in conjunction with the Master Space Plan work, and one for which the Museum has had difficulty finding funding, is electrical work. The Museum of American History is now 20 years old. As part of the revitalization Master Space Plan, many safety and electrical systems are being changed. However, the basic trunk line system/electrical distribution network is antiquated. It is too expensive to replace this system with another. However, a base of \$100,000 will enable the Museum to modify the existing system so that it meets the requirements of new types of lighting units, audio visual units and computerized systems now available on the market. Additionally, it is important to be able to do this work now, at the current juncture of the Master Plan schedule. The Museum is moving ahead with demolition in scheduled areas of the building which will lay bare the old electrical system and allow this work to take place more readily. Postponement would mean more work at some future date and escalated costs as a result.

An additional \$100,000 is requested specifically to enable the Museum to make use of microchips, computers and video disc systems in its newly reinstalled major exhibitions. This increase would allow the incorporation of computer capability in its exhibit design and production. This new technology makes it possible when presenting history exhibits to interconnect different exhibition themes and present them to the public in new interactive formats. The increase would be used specifically for the purchase of hardware and software systems.

Collections Information System (3 workyears and \$215,000) - For FY 1989, an increase of 3 workyears and \$215,000 is requested for the conversion of the Museum's automated collections data file of 1.3 million records from the outmoded Honeywell/SELGEM system to the Smithsonian's new IBM/INQUIRE system. The Museum

took the first steps toward automating its collections data in the early 1970s. The inventory project of 1978-1983 provided the opportunity for accelerating the development of a standardized, Museum-wide data base.

The Smithsonian recognizes management, care and security of its collections as basic Institutional commitments. Development of a Collections Information System (CIS) on IBM/INQUIRE is a Smithsonian-wide priority. CIS at the Museum of American History will permit reliable, on-line, access to the Museum's data and allow the Museum to better manage that data for collections development and management, research, exhibitions, public service, and security. The application of CIS at the Museum also will allow sharing of data with other participating Smithsonian bureaus, which dramatically enhances the research use of the collections. The Smithsonian's current emphasis on research calls for flexibility on the part of bureaus in both the development of and the response to new initiatives in the history, art, and science disciplines. CIS is an essential element of that flexibility.

The requested increase will allow the Museum to hire an analyst/programmer and two museum registration technicians (\$73,000). The analyst/programmer will work with Museum staff and the Smithsonian's Office of Information Resource Management (OIRM) staff on the MAH/CIS design, and the registration technicians will assist in a final review and edit data categories. The Museum's computer usage costs for the Honeywell/SELGEM and IBM/INQUIRE systems are projected at \$100,000, which includes programming and technical assistance provided by OIRM. Training of technical and curatorial staff participating in the conversion process (\$40,000) and funds for supplies (\$2,000) will also be required for FY 1989. Funding is required over a five-year period from FY 1989 to FY 1993. While the Museum expects training costs to go down after FY 1989 to about \$5,000 per year, computer usage costs are expected to increase.

Currently, the Museum does not have the staff positions to provide the necessary technical assistance to accomplish the conversion. If support is not provided for computer usage costs, a continuing burden will be placed on funds, which have declined since FY 1985; backlogs will grow in processing new accessions, loans, and location changes; and information required to verify the inventory data will be unavailable. In FY 1987, there were 700,000 objects in the record keeping backlog. While conversion will occur eventually, the process will be protracted, and data collected during the inventory project will no longer be useful. The Museum will lose accountability for a large portion of its collections.

Columbus Quincentenary Program (1 workyear and \$45,000) - With funding requested for FY 1987, the Museum of American History contemplates a 5-year series of planning conferences, small exhibits, and public programs leading to the opening of the Museum's permanent, 8,000 square feet Quincentenary exhibit for FY 1992, tentatively titled "America's Beginnings." The exhibit will compare Spanish, French, English, and Dutch settlement patterns in North America in the 17th century, emphasizing the difference in the way Native Americans and colonists viewed the environment and their interrelationships with each other.

A two day meeting of archeologists and ethnohistorians in September 1987 will lay the groundwork for developing the script for "America's Beginnings." It will be accompanied by a one day public forum on the archeology of 17th-century colonial sites in North America and the opening of a six-month exhibit on Drakes Bay, a 16th-century European contact site in California.

In FY 1988, a full-time program manager will be hired to coordinate the work of the exhibit team and to organize the conferences, the small exhibits, and the public programs. A second planning conference, on Native American perceptions of European colonists, will be held in March 1988, along with a second public forum and the opening of a small exhibit on 17th-century English settlement sites. The exhibit team will survey the existing collections of artifacts relating to Spanish, French, Dutch, and English settlements in American and European museums, and will identify specific artifacts for exhibit in 1992. Team members will pursue areas of original research identified at the September 1987 planning conference, and a contract will be let to plan an introductory film for the exhibit based on the results of the March 1988 planning conference.

During FY 1989, a series of monthly public programs on the origins of Hispanic culture in the United States will be added to the program. These programs, derived from a series of pilot programs to be conducted in FY 1988, will make scholarly research on the evolution of Hispanic culture in this country available to a popular audience in a variety of formats, including video and television spots. To produce these programs, a full-time coordinator is needed (1 workyear and \$24,000), and support funds for contractual services, supplies and materials (\$21,000).

Conservation (1 workyear and \$60,000) - For FY 1989, an increase of 1 workyear and \$60,000 is requested for an objects conservator (1 workyear and \$35,000) and supplies (\$25,000) are necessary to reduce a very large conservation backlog. Collections in need of conservation treatment and improved storage conditions will receive special attention.

The conservation needs of artifacts in reference collections on the Mall and at Silver Hill are well documented, since detailed conservation condition surveys were begun in 1978. Every year since then, one or more collections have been selected by conservators for an object-by-object examination. Depending upon the type of collection surveyed, between 15 to 30 percent of the objects have been found in serious need of treatment or rehousing. Hundreds of thousands of objects are known to be gradually deteriorating and will ultimately become useless for research or exhibition. Currently, about 50 percent of staff time and supplies are devoted to efforts to reduce the backlog. In addition, all new decisions made by the collection committee require the consideration of conservation needs before approval is given to acquire an object. Despite these efforts, the backlog has continued to increase and to preserve these artifacts, a long-range phased effort, with the addition of staff and supplies to the Museum's present base resources, will be required.

The requested increase will provide a conservator who will coordinate the overall project with collections managers, perform some of the more specialized treatments, and recruit and supervise technicians, interns and volunteers capable of carrying out many of the time consuming but relatively routine procedures. The backlog reduction project is expected to continue indefinitely, and the requested workyear and \$60,000 increase will continue to be dedicated to this project.

Native American Indian Program (1 workyear and \$24,000) - This program was begun in 1986 with the hiring of a program director to promote increased public awareness and understanding of other cultures. In FY 1987, the program director raised funds from Smithsonian and outside sources in excess of \$25,000 to support the production of several educational printed, visual, and audio resources in

American Indian history. In addition, the Program hosted six American Indian students through its internship program, produced six public programs on aspects of Indian history and culture, and established cooperative relationships for project outreach with over 20 Indian communities and tribes. Two books on American Indian history are in manuscript form. Additionally, the Museum coordinates efforts with the American Indian Program in the Museum of Natural History.

Planned for FY 1988 and 1989 are one traveling exhibit, parts of two new permanent exhibits, assistance for the production of two six-part television series on Indian history, a new performance and film series on Indian culture, and various educational materials aimed at Indian and non-Indian audiences.

Without an additional staff member working full-time to support program activities, the Museum cannot hope to respond to the increased number of requests for assistance from tribes and educators. The requested staff member would enable the Museum to build a solid underpinning for the program, independent of part-time, temporary assistance from interns. The failure to stabilize and support the program through additional staff will weaken this new program, which was designed to open the resources of the Smithsonian to American Indians and to the general public. One workyear and \$24,000 will fund the needed program assistant position.

Collections Management - Offsite Storage (\$50,000) - For FY 1989, an increase of \$50,000 is requested for the rental of commercial storage space for Museum of American History collections.

The Museum of American History is facing an acute short- and long-term collections storage problem. A detailed study, which the Museum commissioned in 1985, has concluded that the Museum needs an additional 40,000 square feet of storage to properly accommodate current holdings and to allow for conservative growth. Examples of inadequacies abound -- exhibit spaces and offices are converted to temporary storage, objects are placed in aiseways, and collections are overcrowded in curatorial storage spaces. Renovation and asbestos removal work at Suitland prevents the use of that facility for relief, and collections temporarily stored in Rockville, Maryland, in space formerly occupied by the Radiation Biological Laboratory, must be removed when the lease expires at the end of calendar year 1990. The ten-year Master Plan for renovating the American History Building, which is scheduled to begin in 1988, and the Museum's major Exhibition Reinstallation Program, in progress through FY 1992, will cause displacements for which no professionally acceptable storage alternatives are available.

The requested increase of \$50,000 will fund the leasing of 4,500 square feet of commercial space converted to museum environmental and security standards. Currently, there is no base funding available for this purpose. Leasing of commercial space is required until a long-range solution to the Museum's storage needs can be found. While the future completion of renovation work in the American History Building, the conclusion of renovation and asbestos cleanup at Suitland, and the move of collections into the Museum Support Center will help, the Museum conservatively projects its storage needs to double by the year 1992 to 80,000 square feet. Ultimately, as the space study recommended, a collections Reference Center of 600,000 square feet will be needed by 1996 to handle future growth for new collecting, to provide space for new support labs, and to replace temporary structures at Suitland.

The proper storage of collections for long-term security and preservation goes hand in hand with the Museum's goal to better fulfill its mission through updated exhibitions and renovated facilities. Lack of emergency storage space to accommodate dislocated collections will slow the renovation and exhibition reinstallation process, will continue to discourage collecting, which supports new exhibitions and research, and endangers the collections.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - This income is provided from various sources including the Museum's share of museum shop and cafeteria sales, publication royalties and various annual allotments. In FY 1988, these funds will be used to support the salary and benefit costs for the positions of museum director and a graphic designer, as well as cultural history collections acquisition, an Afro-American Communities project, and the Museum's unique Chamber Music performance and recordings program.

Restricted Funds - The principal sources of income for these funds are individual or corporate gifts and foundation grants which are provided for specific purposes. In FY 1987, the following gifts and grants were received: a gift from E. I. du Pont de Nemours and Co., Inc., to support the exhibition, "A Material World"; a grant from the Japan Shipbuilding Industry Foundation to develop the Museum's bicentennial of the Constitution exhibition, "A More Perfect Union," which will highlight the Japanese-American experience; also a grant from ChemicalBank to support the same exhibit, "A More Perfect Union"; a gift from D.C. Comics to support an exhibit celebrating the 50th anniversary of Superman and a scholarly symposium on the "Modern Day Hero"; a gift from the Noble Foundation for the general support of the Music Program at the Museum of American History; a gift from Miles Laboratories, Inc., to continue the support of an Alka Seltzer oral history program; a gift from Dr. Jesse T. Littleton for the development of a fundraising campaign to sponsor the, "Health in America," exhibit; another gift for the exhibition, "Health in America," from the Sandoz Pharmaceutical Corporation; and the first installment of a five-year grant from Sears Roebuck Inc., to support the recreation of part of the White House in the new exhibit entitled, "Ceremonial Court."

In support of the Museum's ambitious new permanent exhibit on the "Information Age," installments on major grants were received from the following corporations: IBM, Xerox, and Texas Instruments.

Government Grants and Contracts - The Museum received a grant from the D.C. Commission on the Arts and Humanities to support the salary and benefits of a public affairs specialist.

NATIONAL MUSEUM OF AMERICAN ART

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	118	4,932	--	51	4	2,371	--	515	--	--
FY 1988 Estimate	118	5,050	--	114	4	246	--	314	--	--
FY 1989 Estimate	120	5,249	--	59	4	241	--	290	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of American Art (NMAA) is devoted to the acquisition, preservation, study, and exhibition of American painting, sculpture, graphic arts, and crafts. The Renwick Gallery, which operates under the purview of the National Museum of American Art, exhibits American crafts as well as decorative arts and design objects. The Barney Studio House is also maintained by the Museum as a period home open for tours and for special interpretive programs. For FY 1989, an increase of 2 workyears and \$199,000 is requested for collections management (1 workyear and \$70,000); to strengthen research at the Renwick Gallery (1 workyear and \$51,000); to initiate research and planning for an exhibition commemorating the Columbus Quincentenary (\$25,000); and to continue the development of the Inventory of American Sculpture (\$53,000).

PROGRAM - The National Museum of American Art's collection represents American art from its beginnings to the present and serves as the basis for active programs of research, exhibition, and public education. The permanent collection includes approximately 34,000 objects and continues to grow at a rate of approximately 1,000 new acquisitions each year. A portion of the permanent collection is on view to the public on a rotating basis in the Museum's galleries. The balance is available in storage for study or loan to selected museums and university galleries throughout the country. Preservation and restoration of irreplaceable American art works are also important to the Museum's mission. Scholarly research performed by the professional staff results in publications, exhibitions, and educational programs which further the understanding of American art and artists.

The Museum's reference materials are used by both lay and scholarly researchers from a wide variety of disciplines. Unique among the Museum's research resources are the Inventory of American Paintings Executed Before 1914; the Smithsonian Art Index, which lists art works housed in the Institution's non-art museums; and the Index of Pre-1877 American Art Exhibition Catalogues, which documents artistic activities in this country and Canada. These inventories

comprise more than 500,000 computer entries, and constitute the most complete data base on the subject of American art in existence.

Collections - In FY 1987, the Museum received as a gift from Patricia and Phillip Frost a major collection of 114 paintings, sculptures, and graphic works created by members of the American Abstract Artists group of the 1930s and 1940s. This collection will complement the Museum's already strong holdings of realist painting from this same period. The Museum and the National Portrait Gallery also received as gifts a portfolio of photographs by and from Irving Penn.

Other gifts to the museum included paintings by Will Barnet, Robert Birmelin, Sanford Gifford, and John Valentine Haidt; sculpture by Leo Amino and Scott Burton; graphic works by Philip Guston and Herman Maril; photographs by William Christenberry, William Eggleston, and Reginald Marsh; and decorative arts by Rudio Autio, Cornelia Breitenbach, and William Harper.

Acquired as a partial purchase and partial gift, the Herbert Waide Hemphill Collection of American Folk Art is a significant addition to the Museum's folk art holdings. The acquisition of the 378 works in this collection has generated positive response from around the country and makes the NMAA one of the Nation's most important centers for the study and display of American folk art.

The Museum also purchased a major canvas by the 19th-century painter Eastman Johnson entitled The Girl I Left Behind Me. Other purchases included an important early painting by Lee Krasner; sculpture by Harriet Hosmer and Joel Tanner Hart; graphic works by Peter Blume, Dorothy Dehner, and Rose O'Neill; photographs by Dick Arentz, Lisette Model, and Sonya Noskowiak; and decorative arts by John Roloff.

In 1987, the Museum decided to expand its program of activities at the Renwick Gallery, which features American craft and decorative arts. New initiatives include addition of a fellowship for graduate or post-graduate students of craft (sponsored by the Renwick Alliance and the American Craft Council), expanded exhibition and acquisition programs, and appropriate additions to the staff.

The ongoing projects to ensure the safe and efficient storage and handling of art work throughout the Museum were augmented by significant revision of procedures, reorganization and additions to collections management staff. The conservation staff completed significant work on almost 400 paintings, sculptures, works on paper and decorative arts.

Publications - FY 1987 marked the inaugural appearance of Smithsonian Studies in American Art. Co-published with Oxford University Press, the bi-annual journal features scholarly articles offering new interpretations and research in the field. Circulation is already at 1,500 copies, and the frequency of publication will increase to three issues in 1988 and probably four in 1989.

Exhibition catalogues were produced for Gene Davis, A Memorial Exhibition and Modern American Realism: The Sara Roby Foundation Collection. The manuscript for an anthology of critical writings on Man Ray was edited and sent to Abbeville Press, for publication in 1988.

The Museum published its six-volume Index to American Art Exhibition Catalogues, From the Beginning through the 1876 Centennial Year which lists works of art in all catalogues of art exhibitions held in the United States and Canada from

earliest colonial times through the Centennial Exposition of 1876. Other books and publications in the works include a catalogue on the work of Paulanship, a biography of Alice Pike Barney, a catalogue on the drawings of Joseph Stella, and a comprehensive study on Albert Pinkham Ryder.

Several publications were singled out for recognition in graphic design competitions: the invitations for the Ray Metzker and James Rosenquist exhibitions received Awards of Merit from the American Association of Museums; Treasurers from the National Museum of American Art and the Patrick Ireland catalogues received Awards of Excellence from the Art Museum Association of America; and awards and honorable mentions were received from the Washington Book Publishers Association for the Figure Prints checklist, the cover of the Patrick Ireland catalogue, the Rosenquist invitation, and the Women Artists and Research Resources brochures.

Research - This past year saw the successful completion of an Inventory of American Sculpture pilot project undertaken to automate the University of Delaware's index of American sculpture files. Over 6,000 sculpture records were entered in the last 12 months, bringing the total to just over 20,000. These records will provide a firm foundation upon which to launch a systematic nationwide survey of sculpture. A computer format utilizing United States Machine Readable Cataloguing (USMARC) fields and subfields, capable of addressing the unique complexities of American sculpture, has now been fully developed and tested. A sculpture report form has been designed and extensive preparations have been made for a massive mailing planned to announce the beginning of the national inventory and to solicit new entries.

In addition, the Inventory of American Paintings project, upon which the Sculpture Inventory was modelled, also experienced significant growth. Nearly 4,000 new entries were added to the data base, bringing the total number of records to 250,000. Research inquiries were up nearly ten percent from last year--to a total of 1,800 requests. Over 2,100 nitrate negatives from the Museum's Peter A. Juley and Son Collection were converted to stable film, and approximately 800 slides and 9,500 prints were added to the Slide and Photograph Archives. Research requests to the Archives increased an estimated 20 percent over last year. Significant progress was also made in the Artist Authority Project, a relational data base linking the Museum's seven art research data projects. From NMAA's permanent collection, 1,600 names have been researched and a mailing effort to request further biographical information has been implemented.

Exhibitions - During FY 1987, featured works from the Museum's collections, specific artists, and thematic topics pertaining to the history of American art were exhibited. "American Art Deco," organized by NMAA's Renwick Gallery, and "John La Farge," jointly organized by NMAA and The Carnegie Museum of Art, Pittsburgh, opened in FY 1987 and will circulate to a total of six other museums across the United States. "Treasures of the National Museum of American Art," which introduced the Museum's collections to areas of the country where it was relatively unknown, ended its five-city tour and after a brief showing at the Museum upon its return, will be reinstalled in the permanent exhibition galleries along with other new "Treasures" acquired since the tour began in February 1986.

Other exhibitions organized in FY 1987 included: "Gene Davis: A Memorial Exhibition"; "Modern American Realism: The Sara Roby Foundation Collection"; and "Close Focus: Prints, Drawings, and Photographs." NMAA also presented

"James Rosenquist: Paintings 1961-1985" and "American Traditions in Watercolor: The Worcester Art Museum Collection," which were organized by museums elsewhere.

At the Renwick Gallery, outside exhibitions included "Russia: The Land, The People" (organized and circulated by the Smithsonian Institution Traveling Exhibition Service); "Quilts from the Indiana Amish"; and "Dan Dailey: Glass, 1972-1985." To reinforce its identity as the Smithsonian's showcase for 20th-century American crafts, the Renwick opened its first installation of works from the Museum's permanent collection in March. "Alice Pike Barney: The Paris Years" continued on view at Barney Studio House.

Among the exhibitions and installations scheduled to open in FY 1988 at the Renwick and NMAA are: "Lost and Found Traditions: Native American Art 1965-1985"; "The Victorian View of Children"; "Cynthia Schira: New Work"; "Supreme Instants: The Photography of Edward Weston"; and "Post Office Mural Studies."

The National Museum of American Art loaned more than 150 artworks from its permanent collections to museums and organizations across the United States and Europe. NMAA continued its policy of placing European works on long-term loan to educational institutions and small museums across the nation and is considering lending approximately 10-12 European paintings to the National Art Gallery in Wellington, New Zealand in FY 1988.

Interpretive Programs - During FY 1987, the National Museum of American Art and its Renwick Gallery presented a rich and varied program of lectures, seminars, symposia, and films interpreting and amplifying its permanent collection and temporary exhibitions. Programs included lectures by photographer Ray Metzker, artist James Rosenquist, glass artists Dan Dailey, Stephen Dale Edwards and Richard La Londe, and fiber artist Katherine Westphal.

The Washington Post Company provided generous support for a panel discussion held in conjunction with "Gene Davis: A Memorial Exhibition," which included presentations by five prominent art world figures. Walter Hopps, Director of the Menil Collection; artist Jacob Kainen; Jock Reynolds, Executive Director of the Washington Project for the Arts; former Davis pupil Ann Purcell; and Washington Post art critic Paul Richard analyzed the development of color painting in the 1960s and its importance to Washington artists today.

United Technologies Corporation supported an all-day program including presentations by a select group of scholars in the field of American Art in conjunction with "Treasures of the National Museum of American Art." A day-long panel discussion by contemporary artists whose work was featured in the exhibitions "Modern American Realism: The Sara Roby Foundation Collection" and the "Treasures" exhibition was also held.

The Renwick Gallery hosted a symposium cosponsored by SITES and the Kennan Institute for Advanced Russian Studies held in conjunction with "Russia, the Land, the People: Russian Painting 1850-1910," as well as a symposium in conjunction with the exhibition "American Art Deco."

In FY 1988, the NMAA will host a symposium "The Stained Glass Tradition in America," cosponsored by The Carnegie Museum of Art, which will be held on the occasion of the Museum's exhibition John La Farge. A symposium on "American Traditions in Watercolor" is planned in conjunction with the Museum's forthcoming

exhibition of watercolors from the Worcester Art Museum, made possible with support from the Digital Equipment Corporation.

At the Renwick Gallery Lost and Found Traditions: Native American Art, 1965-1985, made possible by the American Can Company Foundation, will include a series of demonstrations of skills by various craftsmen represented in the exhibition, in addition to films on Native American art.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 2 workyears and \$199,000 is requested for collections management (1 workyear and \$70,000); to strengthen research at the Renwick Gallery (1 workyear and \$51,000); to initiate research and planning for an exhibition commemorating the Columbus Quincentenary (\$25,000); and to continue the development of the Inventory of American Sculpture (\$53,000).

Collections Management (1 workyear and \$70,000) - The past three years have witnessed the rapid growth of the Museum's permanent collection through the gift and purchase of several private and public collections: The Container Corporation Collection (311 items), the Sara Roby Foundation Collection (178 items), the Herbert Waide Hemphill Collection of American Folk Art (378 items), and the Patricia and Phillip Frost Collection (114 items). In addition, the Museum has accepted the transfer of approximately one thousand works from the National Museum of Natural History/Museum of Man and sizable holdings from the National Endowment for the Arts. These major collections, over and above the Museum's usual annual purchases and individual gifts, have dramatically increased the Museum's collections management responsibilities.

The Museum's first responsibility is to ensure that these new collections are properly stored, maintained and preserved for future generations. The works will be displayed in rotation with other holdings of the Museum; the remainder of the collections will be in storage and to accommodate these additional paintings, new storage screens must be installed in NMAA's storage areas.

Many of the new collections include sculpture and other three-dimensional objects in a variety of media; the Hemphill Collection of Folk Art, in particular, has a great number of sculptural objects, many of which were created by self-taught artists heedless of sound techniques and practices. The stabilization of such objects and the repair of existing damage will require the services of a trained conservator, with special skills not currently represented on the NMAA conservation staff (which is limited to specialists on paintings and works of art on paper).

The services of an objects conservator are also required to care for the Museum's large collection of American sculpture (considered one of the finest sculpture collections in the country), and for the increasing number of objects in the craft media acquired by the Museum's Renwick Gallery during the past five years. The variety of sculpture and craft objects now in the Museum's collection require the permanent attention of a staff conservator to provide long-range collections care. To ignore such major conservation needs would be a breach of our responsibility to care for the objects entrusted to the Museum.

To provide basic care and storage for these collections, the Museum requests an increase for one permanent conservator (\$35,000), for contract services for objects requiring specialized treatments (\$25,000), and for installation of storage screens in the Museum's protected storage area (\$10,000). In FY 1990 and following

years, the amounts estimated for in-house and contract conservation will remain the same; the increase requested for secure storage will also remain the same, and will be devoted to up-grading other aspects of permanent collection storage.

Strengthen Research at Renwick Gallery (1 workyear and \$51,000) - In the summer of 1986, a Visiting Committee reviewed all programs of the Museum's Department of Crafts and Decorative Arts, which is separately housed in the Renwick Gallery. The Committee's recommendation, with which the Museum wholeheartedly concurs, was that the Renwick Gallery should greatly strengthen the research component of all its programs--acquisitions, exhibitions, publications, and public programs and education. For more than a decade, the Renwick has brought new visibility and attention to America's craft artists; emphasis in the next decade will be on achieving full scholarly status for the field of crafts by raising standards of research, analysis, and connoisseurship.

The Renwick seeks to increase research staff resources by hiring a curator, with full academic credentials and a demonstrated record of research and publication in the field of historical and contemporary crafts. This curator will assist in developing future exhibitions based on significant scholarly issues in the area of crafts and will publish on topics of special significance. This curator will also oversee the new Renwick research fellowship program, to be inaugurated in FY 1988.

To facilitate research for exhibitions and collections, the Renwick library will be improved and augmented, necessitating the installation of a compact storage system. An enhanced library is needed if the Renwick Gallery is to become a center for research in the area of American craft and a base for Smithsonian fellows.

Finally, the Renwick Gallery seeks to enhance the significance of its exhibitions by creating new ones on significant issues and inviting scholars to publish new research in catalogues and books accompanying the exhibitions. Funds are requested for contracts with guest curators and authors, to afford the Renwick the capability of securing services from the best scholars.

For FY 1989, funding is requested for one curator (\$35,000), travel funds for that curator (\$2,000), compact storage units (the first of a three-year library storage renovation) (\$7,000), and contract services for outside scholars (\$7,000). For FY 1990 and the following years, these funds will remain constant. Money allocated to library storage will go to library acquisitions once the storage renovation is complete.

Columbus Quincentenary (\$25,000) - As part of the Smithsonian's celebration of the Columbus Quincentenary, the National Museum of American Art will present a major exhibition, titled "The Promised Land," using paintings, sculptures, graphic arts, printed books, and collateral materials to show how the receding frontiers of the West assumed a mythic attraction for Americans between 1830-1890. The exhibition will demonstrate the dual nature of the settlement of the West--the positive aspects of exploration and development, as well as the problems and dislocations, both physical and psychic, that attended this intrusion into nature's wilderness and the encounter with its native inhabitants.

The exhibition will synthesize a generation of new research in the areas of social, cultural, and art history and will illuminate an aspect of history in which the Smithsonian collections are especially rich. Additionally, new research into

the intentions and accomplishments of the explorers and early settlers will expand our understanding of this westward impulse. A book based on the new research will accompany the exhibition.

For FY 1989, a requested increase of \$25,000 will permit initial research and planning for the exhibition. Travel to study potential exhibition objects is requested (\$9,000), necessary photographic and conservation services will be initiated (\$7,000), archival reference materials will be purchased (\$3,000), and the necessary exhibition management hardware and software will be acquired (\$6,000). For FY 1990, the request will increase to \$50,000, to cover costs of research assistance during the period of greatest preparatory work.

National Inventory of American Sculpture (\$53,000) - For FY 1989, an increase of \$53,000 is requested to commence field survey work on the National Sculpture Inventory Project. In response to a nationwide appeal from educators, cultural historians, conservators, collectors, curators, and scholars, NMAA has begun the task of documenting American sculpture in both public and private collections and in parks and town squares throughout the United States. NMAA was asked to conduct this nationwide survey because of its commitment to research in the study of American art and its expertise in establishing the pioneering and only existing census of American paintings.

Using the successful methodology of the Inventory of American Paintings, a one-year grant from the Henry Luce Foundation provided NMAA with \$65,000 in 1985 to successfully automate the index of American Sculpture compiled by the Art History Department of the University of Delaware. This grant, along with some Federal funds redirected within the Museum's base, provided for the pilot project which explored the feasibility of a systematic nationwide sculpture survey by permitting the testing, formatting and entry on computer of an index compiled over a period of 20 years. The Museum is not able to redirect funds on a sustained basis. Therefore, it is vital that a Federal base be established to support the next phases of the inventory.

The data base, of approximately 20,000 records resulting from the efforts of the pilot project, is the only substantial accessible source of information on the artist, location, physical characteristics and subject matter of sculpture in over 800 institutions. Thus, NMAA has provided the technical assistance and national forum necessary to assemble and share otherwise unavailable information and to respond to new research initiatives.

Since sculpture has been an area in which published material is greatly lacking, implementation of a systematic nationwide survey will be essential to the ultimate success of the project. The requested increase of \$53,000 will allow the Museum to contract with local art historians to conduct the necessary field survey. This systematic effort to locate the bronze and marble statues in the parks and town squares across the Nation will result in the largest research data base on sculpture in the world. The nationwide survey will also serve as a critical first step toward a conservation study of America's public monuments, and as a unique form of educational outreach bringing citizens together on community levels to seek and identify the statues and memorials in their states and home towns which honor great men and women, forgotten heroes, and historic events.

It is anticipated that a systematic nationwide survey of outdoor monuments can be completed in seven to ten years at the requested level of funding. In addition

to funding for contractual services (\$35,000) for a field service coordinator who will organize local volunteer assistance, funding will be applied to travel costs (\$5,000); equipment (\$8,000); and supplies such as film, diskettes and computer ribbons (\$5,000).

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are derived from a variety of sources including the Museum's share of sales in the restaurant and museum shop; royalties from publications; small allotments; sales of slides and photographs; honoraria received by staff while on official duty; participation fees from museums to which National Museum of American Art exhibitions are lent; tuition reimbursement from universities for NMAA interns; and sales of deaccessioned works of art. (Income from sales of deaccessioned works is used only for new acquisitions.) Funds are used to support publications, traveling exhibitions, and public programs; curatorial research and travel; repairs to the Barney Studio House; stipends for summer interns; special events; purchase of photographic supplies; and purchases of works of art for the collection. Through an agreement with the J. Paul Getty Center for the History of Art and the Humanities, funds have been made available to continue the preservation project of the Juley Collection until its anticipated completion in FY 1995.

Restricted Funds - These funds are contributed for specific purposes in the form of gifts and grants from individuals, foundations, or corporations. With support from the Robert Tyler Davis Bequest, prints and drawings continue to be purchased for the permanent collection. Other significant uses of restricted grants and gifts are for the continuation of the Inventory of American Sculpture project supported by the Henry A. Luce Foundation; the purchase of artworks and costs of annual meetings of the American Art Forum supported by various donors; the "Treasures of the National Museum of American Art" exhibition which returned to the NMAA from tour in FY 1987, supported by United Technologies Corporation; the "Art of New Mexico" exhibition, which completed its tour in FY 1987, supported by the Nelda C. and H.J. Lutcher Stark Foundation; the "Gene Davis 1920-1985" exhibition on view in FY 1987, supported by the Washington Post Company and the Institution's Special Exhibition Fund. New funding was received in FY 1987 from Primerica (formerly American Can Company Foundation) and the Sacred Circles Fund for the "Lost and Found Traditions" exhibition in FY 1988; from various donors for the "American Art Deco" exhibition which was on view at the Renwick Gallery from April through June 1987 and will tour through July 1988; and a cooperative agreement was made with the National Endowment for the Arts to produce a bibliography during FY 1987 of resource materials on museum programs accessible to the aged or disabled. The NMAA is actively seeking private funding for the continuation of the Inventory of American Sculpture project and for a number of exhibitions and programs in FY 1988.

NATIONAL PORTRAIT GALLERY

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	83	3,822	--	41	--	32	--	200	--	114
FY 1988 Estimate	86	4,069	--	25	--	37	--	323	--	67
FY 1989 Estimate	89	4,034	--	25	--	45	--	320	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Portrait Gallery (NPG) is dedicated to the exhibition and study of portraits of people who have made significant contributions to American history, development and culture, and of the artists who created such portraiture. The FY 1989 estimate reflects a decrease of \$139,000 associated with nonrecurring expenditures in the FY 1988 base for one-time Bicentennial of the Constitution costs. An increase of 3 workyears and \$104,000 is requested to provide for a computer systems manager (1 workyear and \$35,000), upgrade collections storage areas (\$30,000), and clerical support staff for curatorial and research activities (2 workyears and \$39,000).

PROGRAM - The arts of portraiture and biography are the means by which the Gallery offers a continuing exploration of the heritage and accomplishments of the American people. The Gallery collects, studies, preserves, and exhibits portraits in all media as both historical and artistic documents.

The development of NPG's collections engenders substantial and ongoing research into American political, social, and intellectual history, and the history of American art. Research results are published by curators and historians in scholarly articles and monographs and are shared with the public in substantial exhibitions and their attendant catalogues. Temporary exhibitions in the Gallery frequently deal with subjects or artists never before explored, bringing together works from public and private collections to be shown with objects in the Gallery's permanent collections. The accompanying publications constitute a growing body of books of permanent research value.

The collections of the National Portrait Gallery are cared for by professional conservators on the Gallery's staff.

Collections Acquisitions - The most important painting added to the collections of the National Portrait Gallery in fiscal year 1987 was the splendid

portrait of Benjamin Franklin done in 1785 by J. S. Duplessis; this was a gift from the Morris and Gwendolyn Cafritz Foundation.

Other significant gifts to the Gallery during FY 1987 included portraits of Admiral George Dewey and Mrs. Dewey by Theobald Chartran; nine original plaster busts by Jo Davidson; paintings of David Sarnoff and William B. Astor, the early American composer George F. Bristow; and first president of Vassar College, John Howard Raymond. Additional gifts included a sculptured head of the painter Gardner Cox; John Summerfield, the early Methodist preacher, by William Jewett; and, by purchase and gift, a portrait of the author James Jones by Bernard Childs.

In fiscal year 1987, the Gallery purchased a number of significant portraits using appropriated funds, including paintings of William Pitt Fessenden by Constantino Brumidi; Dr. Helen Lynd by Alice Neel; and Rubens Peale by his brother Rembrandt Peale. Drawings of Justice Louis Brandeis, Charles Lindbergh and Dr. Alexis Carrel by Samuel J. Woolf along with an anonymous sculpture of the first American woman sculptor, Patience Wright, also were purchased. The Presidential portrait series was enhanced by the purchase of a life portrait of President Andrew Johnson by Washington Bogart Cooper. Also acquired were three painted caricatures by Thomas Nast, including a representation of the poet, William Cullen Bryant.

The Print Department received a major gift in 1987 of 107 life drawings of famous Americans (about 40 percent of whom had not been previously represented in the permanent collection) by the renowned portrait illustrator Samuel J. Woolf. In addition, a very fine etching of Consuelo Vanderbilt by Paul Helleu was acquired as a donative sale and Mrs. Alfred Bendiner donated to the library over 300 books covering the history of caricature.

Print purchases included a color woodcut of Jed Harris by William Auerbach-Levy and a set of the five "American Kings" (first five presidents) published by Pendleton after Gilbert Stuart. Drawings purchased in FY 1987 include an important watercolor of President Ulysses S. Grant by Thomas Nast, a watercolor of Edwin Austin Abbey by "Spy" (Sir Leslie Ward), and several crayon portraits by Hugo Gellert. In the area of caricature, the Print Department acquired the remainder of a group of drawings by Henry Major; four early works by Al Hirschfeld; a drawing of John Dos Passos by Adolf Dehn; and three drawings by William Sharp. Posters representing Buster Keaton, Rita Hayworth, and Rudolph Valentino made in France, Italy, and Belgium, as well as an American six sheet poster of James Cagney and an exceptional image of Buffalo Bill were also purchased.

The major purchases for the Department of Photographs included vintage photographs of Gertrude Stein by Man Ray, Dwight David Eisenhower by Richard Avedon, Jack Kerouac by Robert Frank, and Walter Philip Reuther by Josef Breitenbach, a unique ca. 1845 calotype negative of Matthew Calbraith Perry by an anonymous photographer, and a daguerreotype of Franklin Pierce by Albert Sands Southworth and Josiah Johnson Hawes. Gifts included a hitherto unknown ca. 1845 daguerreotype of Jefferson Davis and a collection of original manuscript material relating to the final years and death of Mathew Brady. The Department also instigated the transfer from the Dibner Library of a major album of ca. 1859 salt print portraits of President James Buchanan, his vice president and cabinet, and the leading members of the Senate and House--a unique and extremely important pictorial document of American politics on the eve of the Civil War.

Collections Management - With the assistance of volunteers, the curatorial files in the Prints and Photographs Department are being systematically reviewed and updated; this project will extend into FY 1988. The Meserve Collection inventory is being entered into the computer as the first essential step in generating a corrected, alphabetized index to the collection; and, simultaneously, a 35mm positive film strip of the Meserve Collection negatives is being made to facilitate access to the material. It is hoped that this project will be completed by the beginning of FY 1988.

A major collections management priority for FY 1988 will be the relocation of matted large prints, unmatted prints in boxes, and other cased objects (such as daguerreotypes) to make the most efficient use of the storage space newly made available by the purchase in FY 1986 of sophisticated new shelving units.

In FY 1987, the remainder of the Meade Brothers Collection daguerreotypes (29 plates) were cleaned and reglazed in accordance with recommended procedures. For the reinstallation of the Meserve Collection gallery, historically correct albumen prints were made from the original negatives; and sets of positive transparencies and facsimile negatives were made at the same time so that the original, fragile, glass plates must no longer be handled in making routine prints. Major projects for FY 1988 included the commissioning of albumen prints from an anticipated gift of 16 Brady imperial negatives, as well as the printing of the calotype negative of Mathew Calbraith Perry and the reglazing and resealing of daguerreotypes in the collections which have deteriorating cover glasses. The Gallery also would like to establish a program for the systematic monitoring of the stability of objects in the collection by scientifically sampling image-density levels and observing whether changes are occurring.

Exhibitions - A major reinstallation of the Permanent Collection of the Portrait Gallery was completed during the first half of fiscal year 1987. The reinstallation made the arrangement of the galleries more logical and placed many recently acquired portraits on permanent view for the first time.

The first area reinstalled was the first floor, which is now home to portraits of notable actors, singers, musicians and writers of the 20th century. The mezzanine level is now devoted to the Civil War era, and the second floor houses the Galleries of Notable Americans from 1600 to the present. These period galleries surround a central area in which portraits of contemporary artists and writers are placed. The reinstallation was completed in May with the opening of "Stage Portraits: Photographs by Mathew Brady from the Frederick Hill Meserve Collection."

NPG also opened several temporary exhibitions in FY 1987. "TIME: Man of the Year" is the latest in a series of shows based on original artwork donated to the Gallery by TIME Magazine of key world leaders and heroes. "The Art of Henry Inman," organized by guest curator Dr. William Gerds, brought together over 100 of Inman's works for the first time since his untimely death in 1846, including his portrait of Angelica Singleton Van Buren, never before exhibited outside the White House. "Selections from the American Academy and Institute of Arts and Letters" opened in late May and brought to the attention of the public portraits of key figures in the worlds of art, music and literature from the rarely-seen collections of the Academy. The exhibition will be shown at the Academy in New York City in autumn 1987.

Two exhibitions of Recent Acquisitions were mounted in February and August. In spring 1987, the prints and drawings in "Like and Unlike: Portrait Caricatures by Henry Major and Herman Perlman" proved very popular with the public.

Much time and effort in fiscal year 1987 was devoted to the creation of an exhibition commissioned by the United States Information Agency as part of the Cultural Accord between the People's Republic of China and the United States. The showing in China was aborted, owing to a conflict between the two governments; but the exhibition is now scheduled to be seen in Hong Kong and, if plans can be worked out, in Japan. About 50 portraits are included representing the history of portraiture in America from 1884 to 1984.

The Gallery's FY 1988 schedule will open with a commemoration of the Bicentennial of the Constitution of the United States. "American Colonial Portraits: 1700 to 1776" will portray the society in the New World Colonies from which the new United States evolved. The exhibition will bring together for the first time in half a century masterworks of colonial portraiture, showing the impact of artists from Europe and displaying the works of our first native-born portraitists. Portraits are being borrowed from major American museums and individual owners, and from public and private collections in England, Ireland, Jamaica, Bermuda, and Canada.

Photographs by Julia Margaret Cameron, a 19th-century English artist, will be on view beginning in December 1987. This one woman show, consisting of portraits of famous Britons in the world of arts and letters, is being lent by the J. Paul Getty Museum in California.

April 1988 will bring to the Gallery "The Artist's Mother: Portraits and Homages," an exhibition highlighting approximately 40 works of 20th-century artists, who use their mothers as the subject or inspiration for their work. Later in the month, "Portraits from Gripsholm" will bring masterpieces from the Swedish national collections. This is the latest in a series of shows displaying highlights from European national portrait collections and coincides with the 350th anniversary of the first Swedish settlement in the New World.

In the summer of 1988, an exhibition focusing on the works of the five artists most frequently commissioned to create covers for TIME Magazine will be presented.

The opening exhibition in FY 1989, "ON THE AIR," will focus on the Golden Age of radio and television, saluting the pioneers of American broadcasting. The first major exhibition devoted solely to the works of Winold Reiss, a German born artist whose portraits of black Americans have long been popular with NPG visitors, is slated for December. Reiss, who came to America in the early 20th century, also painted and drew portraits of Native Americans, Asian-Americans and others of diverse ethnic backgrounds. Another exhibition celebrating the Bicentennial of the Constitution of the United States is planned for the spring of 1989. Marking the centenary of his death, an exhibition on Jefferson Davis is planned for the summer.

The National Museum of American Art/National Portrait Gallery Library has maintained a modest, but active, exhibition program. Notable among the FY 1987 activities was the exhibition entitled "Highlights from the Downtown Gallery," commemorating the 60th anniversary of the founding of the Downtown Gallery, known in making the work of living American artists available to the populace. The

majority of the materials on display are in the collection of the Archives of American Art.

There are currently over 200 objects on temporary and long-term loan from the National Portrait Gallery to other institutions across the country, as well as within the Smithsonian. Major loans have been made to the Library of Congress and the Daughters of the American Revolution (DAR) Museum in Washington, D.C., the New York Public Library, and Independence National Historic Park in Philadelphia, and the Huntington Galleries in West Virginia.

Exhibition loans for FY 1988 include a group of photographs to Israel for an exhibition about American photographers, 19 portraits by Robert Vickrey that were used as covers on TIME Magazine to the Canton Art Institute in Ohio and, the most important request, the loan of the portrait of Mary Cassatt by Edgar Degas to the Galeries Nationales du Grand Palais in Paris for a major loan exhibition on Degas. That exhibition will tour to the National Gallery of Canada in Ottawa and the Metropolitan Museum of Art in New York City.

Publications - National Portrait Gallery publications in FY 1987 included book-length studies associated with the exhibitions "The Art of Henry Inman," "Portraits from the American Academy and Institute of Arts and Letters," and "TIME: Man of the Year." The Smithsonian Institution Press is publishing the TIME book as well as American Colonial Portraits 1700-1776, which will accompany that exhibition in the fall of 1987; and it will distribute the 25th anniversary edition of the Permanent Collection Illustrated Checklist (in press July 1987). Also in preparation are the ambitious, definitive study of C.B.J.F. de Saint-Memin, and, in connection with forthcoming exhibitions, books on masterpieces of Swedish portraiture (in both Swedish and English), the First Federal Congress, and the history of American radio and television. The publications program also includes brochures about individual exhibitions and about the museum, as well as the Gallery's quarterly Calendar of Events. A major monograph on Mathew Brady is in preparation and will be completed before the end of FY 1988.

Education - The National Portrait Gallery's public education program continues to combine a daily schedule of docent-led tours with an array of intensive elementary and secondary school and senior citizen outreach programs (such as a musical tribute to Cole Porter) conducted by trained education aides and docents. While the local audience has been addressed for a long time, NPG's Education Department continues to explore ways to broaden its national outreach. In celebration of the Bicentennial of the Constitution, the Gallery developed two programs to be introduced to local secondary school classes in FY 1988: "Constitution Quest: Why A Navy?" developed jointly with the Navy Museum, Department of the Navy and "The Constitution and the Presidency," which examines the ways in which the presidency has shaped and been shaped by the Constitution. The latter will also be produced in a version for gifted and talented students and will include a kit for national distribution to teachers.

In response to curriculum changes in local school systems, an existing program, "Westward Ho!," is now offered to upper elementary as well as secondary schools. In FY 1988, the Department also plans to update and computerize its mailing list and increase the number of teachers aware of its programs through workshops, as well as continue to re-examine and refine its existing programs.

Continuing programs produced by the Education Department include "Portraits in Motion" and its spinoffs, "Portraits in American Jazz," "Portraits in American Song," and "American Voices." In order to address the congressional mandate to the Smithsonian to seek wider audiences in its public programming, "Cultures in Motion," a series of programs developed in conjunction with minority community groups is in the planning stage.

The Department's "Lunchtime Lecture" series and "Speakers Bureau" service now attracts a broad regular audience, as well as visitors who have interest in particular subjects. The expanded "Special Lecture" series provides in-depth looks into the conceptualizing and assembling of exhibitions, often combined with personal insights into individual objects. "Let's Not Talk About Love" is an experimental program offered to senior citizens, which the Department is taking to senior citizen centers in Delaware, Pennsylvania, Maryland, and Virginia.

Research - In FY 1987, the Catalog of American Portraits (CAP) continued its mission of serving professional and non-professional researchers with inquiries concerning American history and American art history. Automation of portrait records continued to be a high priority and approximately 4,250 additional portrait records were added to the computerized database in the past year. Computer printouts and negatives representing these collections were sent to 45 institutions during this period. In addition, portrait collections contained in the Worcester (MA) Art Museum, the New York Public Library, the Union League Club (NYC), Virginia Historical Society, and Randolph-Macon College were catalogued and, when necessary, photographed for our files. A CAP staff member continued to play a central role in the development of the Smithsonian-wide Collections Information System program.

Service to users will remain the first priority for CAP during the coming fiscal year. As available funding permits, field survey work will continue in selected collections. Continuing effort will be made to secure funding for the completion of the national portrait survey.

The NMAA/NPG Library has acquired the microfilm collection of Emblem Books, a valuable iconographic reference source; The Knoedler Library of Art Exhibition Catalogues on Microfiche; The American Biographical Archive; and The History of Photography microfilm collection which contains 202 reels on photography from the International Museum of Photography holdings.

During FY 1987, work continued on transcribing, researching, and annotating selected letters and documents of Charles Willson Peale and his artist-sons Raphaele, Rembrandt, and Rubens. Volume 2 of Selected Papers of Charles Willson Peale and His Family: The Artist as Museum Keeper, 1771-1810 will be published by Yale University Press in December 1987; Volume 3--The Artist in Retirement, 1810-1820--is now scheduled to go to Yale in the spring of 1988.

For FY 1988, the Editor of the Peale Family Papers project is preparing plans and developing funding for a subsidiary project to assemble and publish an annotated and complete catalogue raisonne of the paintings of Rembrandt Peale, 1778-1860, an important 19th-century portraitist. Also planned is a symposium to be held in April 1988, in cooperation with LaSalle University to mark the publication of Volume 2 of Selected Papers.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 3 workyears and \$104,000 is requested to provide for a computer systems manager (1 workyear and

\$35,000), upgrade collections storage areas (\$30,000), and clerical support staff for curatorial and research activities (2 workyears and \$39,000).

Computer Systems Manager (1 workyear and \$35,000) - For FY 1989, an increase of 1 workyear and \$35,000 is requested for a computer systems manager.

Computerization of the collections management process, budget and administrative support, and the necessity to access data on the Smithsonian central computer system increases the urgency of the need for a computer systems manager to guide the development of automation activities. The Gallery is woefully lacking in computer technology, which will continue until the services of a specialist are acquired. This individual will interact with the Smithsonian's Office of Information Resource Management (OIRM) and will provide the attention required in designing, establishing and monitoring programs specifically for our needs.

Currently, each office in the Gallery has at least one microcomputer, and these are used substantially for tasks related to collections management. The computer systems manager will assure automated systems are compatible and will assure that the most efficient ways to accomplish computer tasks are used by Gallery staff. The manager also will have the responsibility for maintaining liaison with other offices of the Smithsonian concerned with automated data systems.

For several years, OIRM has recommended that the Gallery establish such a position, but sufficient workyears and funds were not available. Consequently, if funds are not provided to obtain a computer systems manager, the Gallery's capability of providing competent collections management, budget and administrative support in a rapidly developing and highly technical field will be substantially diminished.

Upgrade collections storage areas (\$30,000) - Conservation, storage and general maintenance of the collections are ongoing activities that have increased steadily without an increase in basic support resources. Collection objects that cannot be accommodated in the Patent Office Building are housed in the Gallery's off-site storage facility located at 1111 North Capitol Street. This facility, 2,250 square feet, is inadequate and is in serious need of upgrading. Also, storage space is not available for a large portion of the collections, nor is sufficient temporary storage space available for the two to three large loan exhibitions produced each year.

To rectify this situation, the Gallery plans to renovate the storage facility at North Capitol Street and install storage screens and shelves. If NPG collections are to be responsibly managed, adequate off-site storage space must be provided. Failure to receive necessary funds will jeopardize approximately one-third of the NPG's 11,000 holdings, thus making it increasingly difficult to receive and to store objects for loan exhibitions.

Additional clerical support (2 workyears and \$39,000) - For FY 1989, 2 workyears and \$39,000 are requested to provide additional direct clerical support for curatorial and research activities.

Cataloguing, data processing and other clerical functions have expanded without an increase in basic support resources. The ten clerical support positions in the Gallery have not increased in nearly ten years, while the requirements for

manuscript typing, labels for exhibitions (text), and brochure typing have increased significantly. It is estimated that the number of letters and memoranda generated has more than doubled in this time period. Also, the collections (approximately 11,000 items) are twice as large as they were ten years ago. Offices such as the Curator, Conservation Lab, Photographs, Registrar and Publications do not have clerical staff and rely heavily on other offices for support. Although automation of clerical duties has substantially increased the efficiency of clerical staff, the workload has increased to such a degree that even this enhanced capability is not sufficient to maintain an efficient operation. When clerical staff are not available to assist, professional staff often are required to perform these tasks. Failure to secure these positions will result in a continuation of diminishing service to the public and diminished efficiency on the part of professional staff with responsibility for the collections and programs of the Gallery.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are derived from several sources including the Gallery's share of sales in the restaurant and museum shop, sales of photographic reproductions of portraits in the collection, staff honoraria, and participation fees from museums to which National Portrait Gallery exhibitions are loaned. These funds are used to help defray the expenses of public lectures, symposia and special events in coordination with the opening of exhibitions; associated costs of loan exhibition development and management; and the research expenses of staff who are preparing special publications or lectures.

Restricted Funds - These funds are received for specific purposes in the form of gifts and grants from individuals, foundations, organizations and corporations. The Gallery has received a grant from the Morris and Gwendolyn Cafritz Foundation which funded the purchase of the portrait of Benjamin Franklin attributed to Joseph-Siffrein Duplessis. The painting is believed to have been commissioned by its first owner, Franklin's close friend and neighbor, Mme. Anne Louise Brillon de Jouy, around 1785, at the time of Franklin's departure from France. Other acquisitions were made possible this year by contributions from Barry Bingham, Sr., Mary P. Sears, Lydia de Polo, Jane S. Murray and Messrs. Jim and Ted Pedas. Among them were the portrait of Louis Brandeis by Samuel J. Woolf, a portrait of James Jones by Bernard Childs and a photograph of Douglas Fairbanks and Mary Pickford by Edward Steichen.

Mr. and Mrs. Max Berry and Count and Countess Frederic Chandon were among those who sponsored the reception to honor H.S.H. Prince Rainier III of Monaco on the occasion of the unveiling of the bust of Her Serene Highness Princess Grace by artist Kees Verkade. The bust was donated to the Gallery by Prince Rainier. The United States Information Agency has provided funds for the organization of a fine arts exhibition, "A Century of American Portraits: 1885-1985," which was scheduled to tour the People's Republic of China in autumn 1987. ProServ, Inc. enabled the Gallery to offer to the public at no charge the "Portraits in American Jazz" concerts by Saratoga Naturally Sparkling Mineral Water and Anheuser-Busch Beverage Group, Inc. CIGNA Foundation has provided substantial support to advertising, promotion and publication of the catalogue for the Gallery's upcoming exhibition "American Colonial Portraits: 1700-1776." The Clarence and Jack Himmel Foundation contributed to the publication on portraits from the American Academy and Institute of Arts and Letters. General Dynamics Corporation, Mr. & Mrs. Joe L. Albritton, the Hechinger Foundation, The Oliver Carr Corporation, and Raleighs have made

contributions towards the 25th anniversary celebration of the Gallery's founding.
A number of smaller gifts have been received from individual donors.

HIRSHHORN MUSEUM AND SCULPTURE GARDEN

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	77	3,253	--	13	--	204	--	1,015	--	--
FY 1988 Estimate	78	3,351	--	18	--	230	--	1,007	--	--
FY 1989 Estimate	78	3,351	--	18	--	138	--	600	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Hirshhorn Museum and Sculpture Garden (HMSG), a museum of modern and contemporary art, was established by an act of Congress (P.L. 89-788, November 7, 1966). Its collection, which numbers approximately 13,000 works, forms the basis of an active program of public exhibitions. The museum staff conducts extensive research, prepares catalogues, and offers a wide range of educational activities including slide and film programs, lectures, concerts, publications and tours. No program increase is requested for FY 1989.

PROGRAM - Since its public opening on October 4, 1974, the programs of the Hirshhorn Museum and Sculpture Garden have attracted one of the highest visitations of any art museum in the United States. In keeping with its status as one of the major museums of modern and contemporary art in the country, the HMSG carries out programs of research, exhibitions, collections management, acquisitions, deaccessions, and education activities involving audiences of all ages.

Research - The Museum's resources include works of art, a curatorial file providing information on artists and works in the collection, and a library with 35,000 books and exhibition catalogues. Works of art not on display are available for study purposes. Currently, the staff is researching the provenance of each work of art in the permanent collection. A system is being developed, using personal computers, that will ultimately allow researchers and the public to retrieve information, including a video image, concerning the collection.

Exhibitions - The Museum conducts an active exhibition program that draws upon its collection, as well as other collections. Approximately 700 works from the permanent collection are on display at any given time. The special exhibition gallery was increased in size by approximately 800 square feet in FY 1987 by moving the Museum Shop to the lobby of the building. In FY 1987, the Museum organized two exhibitions: "Recent Acquisitions (1983-1986)" and "Roger Brown." After its initial display at the HMSG, "Roger Brown" will travel to the La Jolla Museum of Contemporary Art, the Lowe Art Museum at the University of Miami, and the

Des Moines Art Center. "Nancy Graves: A Sculpture Retrospective," organized by the Fort Worth Art Museum; "Morris Louis," organized by the Museum of Modern Art; and "Lucian Freud Paintings," organized by the British Council, were also shown in FY 1987.

Small exhibitions, organized by the Museum's staff and based on its collections, displayed in FY 1987 include: "David Levine: Caricatures," "Bridging the Century: Images of Bridges from the Museum's Collection," "Patterned Images: Works on Paper from the Museum's Collection," and "Arnold Newman Photographs Artists."

In FY 1988, with partial funding from the Smithsonian Institution's Special Exhibition Fund, the Hirshhorn is adding two new exhibition programs, "Directions" and "Works." "Directions"--recast from the Museum's large-scale biennial thematic show--will augment the special exhibitions mounted in the lower-level gallery with small group shows of works by emerging artists and solo exhibitions of specific bodies of work by better-known artists. This series of one-gallery exhibitions will bring into focus some of the most current issues emerging in the art of today.

The second program the HMSG will initiate is innovative in that it will integrate the Museum's building and grounds into the creative process. The HMSG will commission artists to visit the Museum and generate a temporary site-specific work to be on view for approximately ten weeks. The "Works" exhibitions will thereby introduce viewers to a group of artists who create art in a nontraditional way, as well as expand the Museum's limited temporary exhibition space to include the whole museum complex.

In FY 1988, the Museum will organize two major exhibitions: "Alberto Giacometti" and "Different Drummers." After its initial display at the HMSG, "Alberto Giacometti" will go to the San Francisco Museum of Modern Art. "A Quiet Revolution: British Sculpture Since 1965," co-organized by the Museum of Contemporary Art in Chicago and the San Francisco Museum of Modern Art, and "Central European Art," organized by the Museum of 20th Century Art, Vienna, will also be shown at the Hirshhorn.

In FY 1989, the following major exhibitions will be shown: "Gerhard Richter" organized by the Art Gallery of Ontario and the Museum of Contemporary Art, Chicago; "Robert Moskowitz: 1959-1989" organized by the HMSG; and "A Review of the Eighties" organized by the HMSG. The two exhibitions organized by the museum will travel.

Collections Management - The Museum inventories its entire collection on a regular cycle, with spot checks made at least annually. The Hirshhorn Museum has undertaken a review of its permanent collection in order to reshape the Museum's formerly private collection by deaccessioning and disposing of works of art that are judged to be duplicates, redundant, or of inferior quality. The proceeds thus accumulated have created a fund to be used for acquisitions. As specified by law, the Board of Trustees of the Hirshhorn Museum and Sculpture Garden approves all deaccessioning. Certain "special collections," numbering 700 objects, have been transferred to other parts of the Smithsonian Institution where they will continue to be attributed as a gift of Joseph H. Hirshhorn. The Board of Trustees, over a span of two years, has voted to deaccession 470 works of art. With the transfer and the deaccessioning, the permanent collection will number approximately 13,000 objects.

Acquisitions - The legislation establishing the HMSG described the Museum's function as a "museum in Washington, D.C. where modern art could be exhibited and studied...[to]...enrich the culture of the Nation." In order to carry out this mandate, it is essential that the Museum's collection always includes contemporary art and that the Museum keep abreast of current developments in the visual arts. To present an accurate account of esthetic developments on an international level, an active acquisitions program is essential. In FY 1987, the Museum was able to add three works of art purchased with appropriated funds: "Untitled" by Ellsworth Kelly; "The Glass House for the Mobile Figure" by Walter Pichler; and "Untitled" by Joel Shapiro. Purchases with nonappropriated funds include: "Night Portrait" by Lucian Freud; "Angst" and "Cubist Bust" by Oto Gutfreund; "Coral Tree" by Robert Helm; "Untitled" by Jasper Johns; "Untitled" by Jannis Kounellis; "Rubbings From the Calcium Garden...Reshoft" by Irving Petlin; "Seguidilla" by Man Ray; "2-2-1: To Dickie and Tina" by Richard Serra; "Gymnast III" by William Tucker; and "Acceptablelevels" by William T. Wiley.

Education and Public Orientation - To increase visitor appreciation and understanding of specific exhibitions and of modern art in general, the Museum provides visitors with a variety of educational materials, including explanatory wall labels, posters, and brochures. The latter range from a single page to illustrated mini-catalogues and are distributed free of charge to the public. Posters using images from the HMSG permanent collection are sold in the Museum Shop.

Several film series are offered, including a lunch-time series about artists and their work, an evening series by artist filmmakers, and a Saturday series for young people. The Sandoz Corporation has awarded the museum funds to wire the auditorium to improve the sound for the hearing impaired. Events held in the auditorium include concerts by the 20th Century Consort and lectures by artists, critics, and art historians. Occasionally, symposia are organized in connection with exhibitions.

An orientation center was opened to the public in FY 1987. The J. Paul Getty Trust awarded the museum a grant to produce a "Survey of Modern Art from the Museum's Permanent Collection." This slide presentation will be shown in the orientation room on the lower level of the Museum. When available this space will be used for slide or video presentations related to the major exhibition on view.

"Currents," two free seminars for high-school juniors, was developed by the Museum as a program to familiarize students with trends and ideas represented in new works of art. Exploring the interrelationship of current history and art, the two and one-half hour program includes intensive gallery study, a slide overview, and informal discussions. The comments and observations of the students are published and made available to the public as a free exhibition handout.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are provided from several sources, including the Museum's share of sales from the museum shop and plaza cafe. An allotment is provided for the expenses of the Museum's Board of Trustees. Furthermore, funds are made available to support partially the 20th Century Consort, which has been performing at the Hirshhorn Museum for many years.

Restricted Funds - In order to restore to the Hirshhorn Museum and Sculpture Garden its art acquisition funds, which with the approval of the donor, Mr. Hirshhorn, were used for construction costs in 1973 and 1974, the Smithsonian Institution in FY 1986 established a restricted endowment fund for the Museum in the amount of \$2.5 million. Concurrently, a special purpose fund also was established in the amount of \$700,000 to be used immediately for art purchases. The Museum has established a fund for the proceeds from deaccessioned works of art sold at auction, which will be used to purchase new art works for the permanent collection. The Board of Trustees has agreed that up to ten percent of the amount in the endowment income fund and the auction proceeds fund as of October 1 of each year may be used for the purchase of works of art. In addition, the Museum has raised outside support from various sources to help acquire important major works for the permanent collection.

The Xerox Corporation and Credit Suisse have pledged to support the major exhibition, "Alberto Giacometti." In addition, Balair/Swiss has agreed to provide transportation and shipping. The Sardoz Corporation awarded a grant to be used to wire the auditorium to make it accessible to the hearing impaired. The La Jolla Museum of Contemporary Art, the Des Moines Art Center, and the Lowe Art Museum at the University of Miami have signed contracts to cover the costs of their showing the "Roger Brown" exhibition. The J. Paul Getty Trust provided funds to create an audiovisual presentation on modern art to be shown in the orientation room.

CENTER FOR ASIAN ART

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	63	3,929	1	178	--	3	22	1,873	--	--
FY 1988 Estimate	68	3,961	1	90	--	1	22	1,528	--	--
FY 1989 Estimate	69	4,411	1	91	--	--	22	1,524	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Center for Asian Art is comprised of the Freer Gallery of Art, established May 5, 1906, and the Arthur M. Sackler Gallery, established July 28, 1982. Both galleries are devoted to the acquisition, study, conservation, interpretation and exhibition of Asian art. The Sackler Gallery, which opens to the public on September 28, 1987, has an exhibition program that includes temporary loan exhibitions to and from other organizations which is not possible at the Freer because of the terms of the founder's will. The Freer Gallery of Art has a continuing program to display its collections as keys to understanding the civilizations that produced them. For FY 1989, an increase of 1 workyear and \$450,000 is requested: for collections storage equipment (\$150,000) and furnishings and equipment for the Technical Laboratory (\$150,000) for the Freer Gallery; and for publications and an education specialist (1 workyear and \$50,000) and for collections acquisitions (\$100,000) for the Sackler Gallery.

FREER GALLERY OF ART

PROGRAM - The Freer Gallery of Art houses one of the most distinguished collections of Oriental art in the world. The collection consists of over 27,000 works of art from China, Japan, Korea, India and the Near East and spans 5,000 years. Included in the collection are paintings; sculptures and other objects in stone, wood, lacquer, jade, pottery porcelain, bronze, gold and silver; and Biblical manuscripts. "The Peacock Room" by James McNeill Whistler is a highlight of an outstanding collection of American art that Charles Lang Freer, the Gallery's founder, considered a bridge between the arts of the East and West. Items not currently on exhibition are available to students and scholars for study. In addition to the collections, the Gallery shares with the Sackler Gallery a public library of approximately 45,000 volumes relating to the objects in the collections.

The unique Oriental collections in the Freer Gallery, together with notable holdings of American paintings, have made the museum a center for students, scholars and the general public on an increasing basis. This growing interest has

been manifested in a steady increase in visitors, in requests for museum tours, lengthy periods of advance bookings for authentication appointments, and the number of visiting scholars and dignitaries.

Research - Freer Gallery research facilities, comprising the collections, curatorial staff, library and technical conservation laboratories, form the nucleus of its specialized public service. Research findings are made available to the public through exhibitions, catalogues of exhibitions, articles, free gallery leaflets and public lectures at the Freer as well as at other similar institutions. Updating the research files on individual pieces in the collection continues. These files are made available to visiting scholars and students as well as the general public.

The results of curatorial research are most visible in the Gallery's exhibitions through labels and leaflets. However, additional research results made available to the public can be found in collection research records, in lectures, and in published papers and books.

Exhibitions - The Freer collections of Chinese art are represented in an exhibition of a dozen of its finest paintings, a selection of ceramics and bronzes, the earliest dating to the second millennium B.C., and lacquerware.

The installation of Japanese art includes a diverse group of 13 paintings, spanning the late 12th through the 19th centuries; 40 ceramic objects; two pieces of lacquerware, and two early bronzes offering an opportunity for visitors to compare objects in several media. A selection of screens is on view in the screen gallery.

Paintings and a wide array of objects in silver, gold, ivory, jade, brass, steel, ceramic and glass reflect the quality and diversity of the Freer's collection of Near Eastern art. Objects in the exhibition date from the fifth century B.C. through the 18th century and come from North Africa, Egypt, Syria, Iraq, Iran, India and Turkey.

Eleven sculptures of stone and bronze and five paintings fill the South and Southeast Asian gallery with representations of Buddhist and Hindu gods from the Indian subcontinent and Indonesia, and span the second century B.C. through the 17th century. Among the highlights is the Freer's famous "Parvati," a 10th-century bronze representing the consort to Shiva, Hindu god of destruction. Another bronze, this one made in the 13th-14th century, is "Nandi", the bull who was both "vahana" (vehicle) for and companion to Shiva.

Although the Freer is best known for its holdings in the arts of Asia and the Near East, it also houses a collection of works by American artists of the late 19th and early 20th centuries, including a major group of works by the expatriate artist James McNeill Whistler. The current selection exhibited includes 17 paintings by Whistler, Dwight William Tryon, Thomas Wilmer Dewing and John Singer Sargent.

In addition, 19 paintings represent the American artist best known for his graceful representations of women. Dewing, born in Boston in 1851, studied art in Paris in the French academic tradition. In the United States in 1895, he helped to found a group called "The Ten American Painters," also known as the American Impressionists. Unlike his peers who found landscape painting the appropriate

vehicle for expressing innovative ideas about light and color, Dewing used landscapes primarily as backgrounds for his elegant figural interpretations.

In 1973, the Freer published a catalogue, Chinese Figure Painting. This was the only study in this field, and it has been out of print for eight years. Revision of this text for publication has necessitated a comprehensive review of all literature on that subject during the past 14 years, including scholarly developments evolving out of the original publication.

The Technical Laboratory of the Freer Gallery is renowned for its research activities, in addition to the ongoing conservation and restoration of objects in the collection, and to the examination of potential collections acquisitions. In the past year, the staff of the Technical Laboratory has been primarily concerned with the conservation of the objects for the inaugural exhibitions in the Sackler Gallery. Environmental control of the Sackler exhibition galleries and collection storage areas also required attention.

Research in the area of conservation concentrated on the extension of identification methods into the field of organic colorants in paintings and the lead isotope ratio analysis of Chinese bronzes in the Sackler collections. Specific Freer research included the study of unusual copper green pigments on Ukiyo-e paintings, "lead white" on Japanese paintings, identification of pigment samples taken from excavated objects (dated to the 5th-8th centuries A.D.) in Korean museums, microscopic identification of paper fibers from very small samples, and investigation of the metallurgy and properties of high-tin bronzes, including reconstructing the alloy and production methods used in making high-tin bronze mirrors from Aranmula, India.

Collections Acquisitions - A sum of \$100,000 was appropriated for the first time in FY 1985 for collections acquisitions for the Freer Gallery. FY 1987 Federal funds were used to purchase an Indian metalwork piece dating circa 1650-1700. In addition, a Korean lacquer box with inlaid mother-of-pearl from the 17th century was purchased with Federal funds. Purchases for the collection with Freer nonappropriated trust funds include: a Tibetan gilt-bronze figure from the 13th-14th century; two Korean ceramic jars from the Three Kingdom Period (3rd-4th century, A.D.); an Indian lacquer pen case, dated 1587; a Japanese hanging scroll titled "Peach Blossom Spring," by Tani Buncho (1764-1840); a Chinese 14th-century Ming dynasty blue-and-white plate, an Indian painting of Krishna from the early 16th century; a Chinese Ch'ing dynasty calligraphy; a Japanese Edo period (1718-1804) calligraphy and a 15th-century Anamese ceramic dish.

Education - The Freer Gallery carries out a wide range of research and scholarly activity which is made available to the public in a number of ways. The popular lecture series held each year at the Freer has been temporarily discontinued until after the completion of the renovation. However, free introductory brochures were given to the visiting public and mailed to individuals and groups who write for general information on the Freer. Additional educational offerings included a free introductory brochure for the visually impaired; the continuation of the highly successful free exhibition leaflets introducing various aspects of the Gallery's collections; and the tours given by docents. In FY 1987, over 20,000 visitors joined the weekday and weekend tours given four times daily.

Educational outreach continues through a new education program being developed for the elderly and the young. Currently, slide sets are available for docents to

speak to community groups. Pre-visit education packets are sent to schools prior to their tours of the Freer Gallery. Tours covering specific areas of the collection are presented to school and community groups studying these areas of Asian art.

Renovation Project - In FY 1988, work will begin on a two-year, multimillion dollar construction project that will provide underground passage between the Freer Gallery of Art and the Arthur M. Sackler Gallery, and excavation work to provide additional space for the storage, conservation and technical study of Asian and Near Eastern art. The expansion is required to allow convenient access between the Freer and Sackler for visitors as well as staff, who have responsibility for the collections of both museums; to serve a growing need for specialized Asian art conservation due to the Sackler Gallery's regular schedule of loan exhibitions; and, finally, to accommodate safely the Freer collections, which have nearly doubled since the museum opened in 1923.

When actual construction begins in 1988, only a portion of the public exhibition areas will be affected. However, by the end of 1988, it will be necessary to close the building to the public. The completely refurbished Gallery should open in 1991.

Expanded facilities will be "carved out," literally, from beneath the Freer courtyard, as well as from unused space in its basement and sub-basement. The courtyard must be excavated for the construction of the Sackler-Freer passage, so it is economical to expand the excavation to gain needed additional space at the same time.

The project will increase the Freer's collection storage area by 70 percent, to 11,500 square feet; provide 3,200 square feet of additional exhibition space in the Freer section of the passageway between the two buildings, and increase the conservation facilities on the Freer's ground level from 1,750 to 5,765 square feet. In addition to the renovation of other areas, improved access to the galleries for visitors with physical disabilities will be provided by a passenger elevator from a ground-level entrance and lobby on the south side of the building.

ARTHUR M. SACKLER GALLERY

PROGRAM - The primary goal of the Sackler Gallery is the advancement of the scholarly appreciation and public knowledge of Asian art. Towards this end, Dr. Arthur M. Sackler donated a collection of nearly 1,000 objects in the fields of Chinese, Indian, Southeast Asian, Near Eastern and Japanese art to the Smithsonian. This collection includes Chinese jades spanning a period from Neolithic times (5000 B.C.-1500 B.C.) into the 19th century; Chinese bronzes from the Shang (ca. 1523 B.C.-ca. 1028 B.C.) through the Han (206 B.C.-A.D. 220) dynasties; Chinese painting; Chinese lacquer, Near Eastern ceramics and metalwork, and sculpture from Cambodia, India and Thailand. The public opening of the Sackler Gallery will take place on September 28, 1987.

Research - Research is the fundamental focus of the Sackler Gallery, providing the basis for exhibitions, publications and collections acquisitions. The research program involves both visiting scholars as well as the curatorial staff.

Additionally, the Asian art history journal Artibus Asiae, now totally funded by the Sackler Foundation, is produced by the Gallery (although its contents are

independent of the Sackler Gallery programs and collections). A journal of scholarly research devoted to Sackler Gallery exhibitions and collections is also published by the museum. These two journals make the Gallery a major center for research publications on Asian art history. Exhibitions, exhibition catalogues and lectures at the Gallery are generated from specific research projects. The Gallery's publications program also includes a quarterly bulletin, Asian Art, intended for the general public. The bulletin has color plates and informative text relating to the permanent collection, recent acquisitions and special exhibitions. Free leaflets are provided in the exhibition galleries.

Conservation - The Sackler Gallery has a responsibility to protect and conserve the art objects under its purview. This includes the objects in the permanent collections, in loan exhibitions held in the Gallery and in Sackler-organized traveling exhibitions, and in Asian objects from other Smithsonian museums. Following the long practice of the Freer Gallery, the Sackler conservation effort includes object research to understand the origin of objects and therefore better develop the proper treatment of them. Expansion of the conservation facilities in a renovated Freer building will accommodate the requirements of the Sackler programs. During FY 1987, the staff of the Technical Laboratory has been primarily concerned with preparing the objects of the Sackler gift for exhibition. X-ray fluorescence equipment as well as x-radiography for occasional radiographs are being used for analysis of the Sackler objects.

An expanded Oriental art painting conservation program also is being planned. The Oriental art restoration studio takes a more traditional approach toward the conservation of East Asian paintings and screens than do Western conservation laboratories. Besides the work related to the Sackler collections and exhibitions, the Studio also looks forward to a future program to train Americans in order to alleviate the critical shortage in this country of persons skilled in this specialized field. There are only three facilities in the United States capable of restoring and mounting rare East Asian paintings and screens, and they are occupied fully with the works in their respective museums.

Exhibitions - An extensive exhibition program in the new building displays the initial Sackler gift together with other major objects on loan from the private collection of Dr. Sackler. The inaugural exhibitions include "In Praise of Ancestors: Ritual Objects from China," "Monsters, Myths and Minerals," "Pavilions and Immortal Mountains: Chinese Decorative Art and Painting," "Nomads and Nobility: Art from the Ancient Near East," "Persian and Indian Paintings: Selections from a Recent Acquisition," "Temple Sculptures of South and Southeast Asia," and "Chinese Buddhist and Daoist Imagery."

Future exhibitions will include those originated by the Gallery as well as traveling exhibitions organized elsewhere. Exhibitions will be drawn from international public and private collections as well as from the Sackler collection. It is expected that many Gallery-organized exhibitions will travel to other museums and institutions. Future exhibitions will include "The Chinese Scholar's Studio," "The House of Timur: Princely Arts in 15th-Century Iran," "Masterpieces of the Chinese School Painting," "Mughal Gardens," and "Photographs by Raghbir Singh." Under consideration for future exhibitions are Chinese mirrors, Ordos bronzes, Chinese lacquer, Indian and Southeast Asian sculpture, Chinese garment hooks, Sasanian metalwork, Chinese furniture, Near Eastern ceramics, Far Eastern ceramics, and Chinese sculpture. Research catalogues will accompany these exhibitions.

Education - In addition to the publication programs, the Sackler Gallery has attracted a large number of research scholars and will have an active program for awarding research fellowships. Fellowship recipients work closely with curators on topics related to the collections. A grant from the Rockefeller Foundation has made it possible to establish a Rockefeller Foundation Residency Program in the Humanities at the Smithsonian Institution. The grant, which supports residential fellowships in Asian and African art, provided two to three post-doctoral appointments each year beginning in 1985 and continuing through 1988. The Rockefeller Residency Program differs from existing fellowship programs in that it allows the fellows direct involvement in the plans and programs of the museums, and participation in symposia, exhibitions and publications.

Other such scholarly grant programs are being explored to further the research and education programs that will utilize the collections and exhibitions at the Sackler as well as enhance the scholarship of Asian art.

A classroom in the Sackler Gallery is used in conjunction with local schools, colleges and universities. Programs have been developed to allow students at secondary, undergraduate and graduate levels to participate in symposia and seminars and come into direct contact with major works of art and distinguished scholars and curators.

Collections Acquisition - The Sackler Gallery will continue to acquire art objects in those fields of central interest to the museum, e.g., the arts of Asia in its broadest terms, from Japan to the Near East. Objects acquired for the collection in the future will continue to be of high quality with respect to esthetic standards, cultural history and physical condition. Objects may be acquired by gift, bequest or purchase provided that they meet established acquisition criteria. Gifts to the collection during FY 1987 included 26 Aditi (Indian) terracotta figures and doors, six Indian Mughal paintings, two Japanese ceramics and six Japanese prints.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 1 workyear and \$450,000 is requested: for collections storage equipment (\$150,000) and furnishings and equipment for the Technical Laboratory (\$150,000) for the Freer Gallery; and for publications and an education specialist (1 workyear and \$50,000) and for collections acquisitions (\$100,000) for the Sackler Gallery.

Collections Storage Equipment (\$150,000) - Over a period of five years, \$2.76 million will be required for furnishings and equipment of the renovated basement and sub-basement of the Freer Gallery. The initial request of \$100,000 for collection storage equipment for the Freer is currently before Congress. The additional amount of \$150,000 requested in FY 1989 will be used to continue furnishing the Freer Gallery's storage space with storage cabinets, computer terminals and teaching equipment.

With over 27,000 objects available for exhibition in the Freer collection, the impetus for the construction of the Quadrangle project came in part from the search to modernize and expand the storage of the collection. For 65 years, most of the collection was housed in wood and glass cabinets that are built into the various storage spaces. Almost all of these cabinets will be destroyed in the course of the renovation. Where possible, the existing metal cabinets will be retained. This includes the original metal cabinets for jades and for pottery shards used in Charles Freer's home. In both cases, however, there is a need for additional metal

cabinets for these objects. The larger storage facilities which are planned will also permit more scholars and groups of students to see different parts of the collection at the same time which was not always feasible in the past. The greater space in the new storage cabinets will allow the objects to be stored less densely and thus more safely.

The renovation project for the expansion of the Freer Gallery storage facilities was conceived in the 1960s and is one project that has had Institutional priority for decades. It is the superior, modernized facilities that are to house the collections which are needed to create the research environment sought by the Secretary for the Institution. Of equal priority is to ensure the finest care in the preservation of the National Collections by identifying associated requirements.

Furnishings and Equipment for the Technical Laboratory (\$150,000) - The requirements for the Oriental Art Conservation Studio are relatively modest since they continue to use traditional techniques in their work. In contrast, the requirements for the Technical Laboratory are more substantial. Much of the existing equipment now shows the age of the decades and is in need of replacement with state-of-the-art equipment. In order to meet the expanded responsibilities with regard to the Sackler Gallery's programs in traveling exhibitions and in training conservators specializing in Asian art, additional equipment is required. Examples of such equipment are the following: a metallurgical microscope which is used to investigate metallic objects and their microstructure, costing \$50,000; a reflectance spectrophotometer for investigating and recording the color of paintings, costing \$30,000; and an operating stereomicroscope, costing \$20,000.

This request falls in line with the Secretary's emphasis in maintaining and improving technical assistance, equipment and facilities which support collections-related and original conservation research. Modern equipment will make new research possible.

Education and Related Activities (\$50,000) - Funds are requested for an education specialist to assist the Sackler Gallery to plan and to implement seminar and lecture programs seen as essential to the education of the public and scholars in the area of Asian art. Currently, \$50,000 exists in the Sackler's base for this program.

The Sackler is at a critical stage of growth making it imperative that the museum become visible and productive as quickly as possible. Publications and education programs on Sackler exhibitions and collections will publicize the museum and its activities, making them known to the public and to scholars throughout the world. More importantly, these programs will bring the culture of Asia into greater prominence and assist the Gallery to achieve its broader goal of increasing understanding of the Asian world.

This request includes funds for an education specialist (1 workyear and \$29,000) and support funds (\$21,000) for leaflets, booklets and exhibition catalogues, and for classes, seminars, and lecture programs. This request for FY 1989 supports the basic mission to increase and diffuse knowledge in line with the Secretary's recommendations of promoting outreach activities and educational products for the general public.

Collections Acquisition (\$100,000) - The amount of \$100,000 is requested to begin an acquisition program. The Sackler Gallery requests these funds to acquire art objects in those fields of central interest to the museum, e.g., the arts of Asia in its broadest terms from Japan to the Near East. Objects acquired for the collection will be of high quality with respect to esthetic standards, cultural history and physical conditions. The Sackler Gallery currently has no Federal funds for the purchase of objects; it is the only Smithsonian museum in Washington not receiving Federal funds for collections acquisition. In order for the Sackler Gallery to fulfill its goal of increasing and diffusing knowledge which encompasses maintaining the highest quality of research, promoting education programs and providing a stimulating, educational experience, a comprehensive collection is required. The request of \$100,000 to begin an acquisitions program will assure the attainment of this goal.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are provided from allotments and are used to defray the costs of special events associated with the opening of new exhibitions and to cover the travel costs of members who attend the Freer and Sackler Visiting Committee meetings. These funds also support the position of coordinator for special programs in the Center.

In FY 1986, the Sackler Gallery was very fortunate to acquire the Vever Collection, one of the finest collections of Persian art ever assembled, consisting of 39 volumes, 291 miniatures, 98 calligraphies and illuminations, 29 bookbindings, four textiles and examples of almost all of the classical Persian texts known. Funds allotted for the purchase of this collection include \$3,500,000 in FY 1986 and \$1,500,000 in FY 1987 with the balance of \$2,000,000 to be funded through Smithsonian Institution Trust funds and private contributions.

Restricted Funds - The major portion of the nonappropriated Trust funds used by the Freer stems from the Charles Lang Freer bequest and is restricted by the conditions stipulated in that document. The funds are used to help finance the Freer's professional curatorial staff, administrative staff, acquisitions for the collection and library, the maintenance of the Freer's courtyard and the operation of the Freer museum shop. Funds from the Harold Stern Memorial Endowment support scholarly research in the field of Japanese art.

ARCHIVES OF AMERICAN ART

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
	FTE*	Amount	General		Special		FTE**	Amount	FTE**	Amount
FY 1987 Estimate	19	1,015	--	92	--	--	12	758	--	--
FY 1988 Estimate	19	1,041	--	108	--	20	12	945	--	--
FY 1989 Estimate	20	1,080	--	98	--	--	12	826	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Archives of American Art is a national research bureau with regional centers located throughout the country. The Archives, which holds more than nine million documents, 400,000 photographs, 75,000 works on paper, and approximately 3,000 tape recorded oral history interviews, is the Nation's largest repository of documentary and source materials relating to the history of the visual arts in the United States. The original material in these collections is housed in Washington, D.C., while microfilm copies of the collections are held in regional centers in Boston, New York, Detroit, San Francisco and Los Angeles. In addition, special collecting projects are active in Philadelphia, Chicago and the South. For FY 1989, an increase of 1 workyear and \$39,000 is requested to hire an archival registrar and to fund related support costs.

PROGRAM - Founded in 1954 as a private institution in Detroit, the Archives became a bureau of the Smithsonian in 1970. The Archives of American Art promotes the study of American art and cultural history by assembling and preserving an ever expanding collection of letters, diaries, sketchbooks, business papers, photographs, oral history interviews, drawings, and prints. In making these resources and other forms of primary records available to researchers and the public, the Archives advances the scholarly analysis and interpretation of the arts in America.

Research - Most research conducted at the Archives of American Art is done by graduate students, museum curators, college and university faculty members, art gallery staff, and free-lance art historians. In FY 1987, individuals representing these groups paid 3,300 research visits to the six Archives regional centers and borrowed 1,800 rolls of microfilm. While no measurement of the knowledge, facts, and insights gleaned from the use of Archives holdings is available, access to the collections is reflected in acknowledgements and footnote citations in more than 200 books, articles, exhibition catalogues, and dissertations published or completed during the year. Much of the Archives' staff research is directed toward the acquisition and description of new material, but it results in articles, papers delivered, exhibitions, and symposia as well. The quarterly Archives of American

Art Journal serves as a medium for scholars and staff publication and regularly carries articles written by the regional directors.

Development of Collections - Acquisitions made this year by the Archives of American Art have a high level of research value for art historians. Among the 250 collections received were the extensive records of the Milch Gallery in New York, which handled the work of contemporary artists from the early 20th century to the 1970s; the records of Victor Spark, a New York dealer who specialized in 19th-century American paintings for nearly 50 years; and the records of the National Arts Club, an artists' social and professional organization founded in 1898.

Individual artists whose papers will be especially welcome to art historians are sculptors: Robert Smithson and Harry Bertoia; and painters: Abraham Rattner, Morris Louis, Hugo Gellert (who died last year at the age of 94), and Alphaeus P. Cole (who is still living at the age of 112). The Archives also acquired useful groups of letters written by such major figures as Alexander Calder, William Glackens, George Grosz, William James, Stanton Macdonald-Wright, Henry Miller, Clyfford Still, and Edward Weston. A diary kept by Lucia Fairchild Fuller has lengthy passages describing John Singer Sargent; and a two volume history of American art, published in 1834, has corrective and irritated marginal notes by Thomas Cole, founder of the Hudson River School.

Collectors, art historians, and museum curators now represented by voluminous collections of papers at the Archives, are the Cone sisters of Baltimore, Lloyd Goodrich, Holger Cahill, and Dorothy Miller. The Oral History Program was strengthened this year through taped interviews with Richard Diebenkorn, Lux Feininger, George Goodspeed, Hassel Smith, and Millard Sheets.

The Archives' documentary surveys in Philadelphia, Rhode Island, and the southern states were completed in FY 1987, and the microfilming of selected papers is under way. The Chicago survey of institutional holdings is also completed, with concentration now being given to privately held collections. Special collecting projects in Philadelphia and Chicago remain active and funded by grants. Another kind of survey, undertaken to determine gaps in the oral history collection, identified over 300 prominent national art world figures whose recollections should be recorded, some of them without delay. A foundation grant for that purpose will be sought in fiscal year 1988.

Exhibitions - The main Archives' exhibition of FY 1987 presented photographs, letters, and other documents on the Bauhaus school in Germany and its influence on American design. Held at the Boston Public Library, the exhibition was accompanied by an explanatory checklist of the items shown. Several museum art exhibitions at Yale University; the Art Institute of Chicago; the Anchorage, Alaska, Museum of History and Art; the U. S. Naval Academy; and the Currier Gallery of Art in Manchester, New Hampshire drew heavily on Archives' materials. Preparations are being made for a FY 1988 exhibition of documentary items to be mounted in New York in connection with the 75th anniversary of the Armory Show of 1913.

Public Education - Most of the Archives' educational activities are directed towards scholars, students, and members of the public who take a serious interest in American art and cultural history. The Archives' Journal is the chief means of reaching that community, and its articles, reviews, reports, and edited documents offer substantive information in an appealing format. Two symposia are being prepared for FY 1988--one on the impact of modernism in Chicago prior to 1940 and

the other on the art community in northern California in the first half of the 20th century. Members of the staff regularly deliver public lectures on aspects of American art and the Archives itself. Four formal staff papers were given at professional conferences in FY 1987. The Archives also sponsored five informal seminars in which art historians discussed the problems and results of their current research.

Conservation and Care of Collections - With funds appropriated by Congress in FY 1986 specifically for conservation, the Archives launched a systematic program for the repair and preservation of especially valuable objects in its collections. Seventy-four works of art on paper, photographs, scrapbooks, and rare publications were given professional treatment at a leading conservation center in Philadelphia. The computerized inventory of the collections, a long-term project under congressional mandate, proceeded during the year. A four-person team devotes itself to this activity and two other staff members concentrate on the detailed cataloguing of works on paper and photographs.

EXPLANATION OF PROGRAM INCREASE:

Archival Registrar and Support (1 workyear and \$39,000) - For FY 1989, an increase of 1 workyear and \$39,000 is requested to strengthen collections management and research activities by providing the Archives with an archival registrar to organize and to manage its registrarial and cataloguing functions.

The Archives of American Art, now in its 33rd year, has approximately nine million items in its collections and its mission is to provide vital documentary material for and encourage original research in American art and cultural history. The Archives receives annually some 250,000 new items contained in some 250 collections from all over the country. The work of the requested position has been performed by various technicians whose principal duty is processing papers. Various staff members also prepare, insure and ship an estimated 250 individual items from the permanent collection each year for photoreproduction, for use in museum exhibitions and catalogues, and for conservation treatment. This position is essential to provide adequate control of the collections, to maintain acceptable standards for recording movement and use of the collections, and to manage the necessary record keeping.

The registrar will be responsible for the automation of records data. This will enable the Archives to control centrally the movement of all of its collections, from the point of receipt at regional centers to shipment to Washington, D.C. for final processing, to moves in and out of storage, or shipment of individual items from Washington, D.C. for conservation treatment or exhibitions use. Various records systems--including acquisitions and accessions data, inventory data, shipping documents, cataloguing information, loan and insurance documents--will be managed by the registrar. Further, once the registrarial function is fully operational, the Archives' administration will acquire an accurate and unified picture of the collecting, processing, and handling activities. Finally and most importantly, the addition of a registrar will permit archives technicians presently sharing various registrarial duties to devote their time to activities which they were originally hired to perform.

The increase requested will be used to hire an archival registrar (1 workyear and \$29,000) and to fund necessary support costs, a computer station, software, and supplies (\$10,000). In FY 1990, additional funds will be sought to support

registration operations, including matting and packing materials, shipping, communications, and travel.

Presently, base resources are not available to support the registrarial function. The addition of a professional registrar to the staff will allow the Archives to respond effectively and in a more propitious manner to research needs, and to process the important materials it is finding and make them ready for research use.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are provided through annual allotments to defray costs associated with special events, supplement travel expenses incurred by the Archives' Board of Trustees, and to provide partial support for general operating costs. With full support from a special purpose fund, the Archives will publish in FY 1988 its new edition of From Reliable Sources, a publication which is the chief means of informing the public of some of the important documents in the Archives' collections, the use of documentary records in historical research, and the role of the Archives in preserving the records of American cultural history.

Restricted Funds - These funds are generated through fund raising activities, gifts, as well as foundation and corporation grants, and a membership program. A substantial portion of this income is used to support the Archives' general operating expenses, its oral history program, and publications program.

Foundation and corporate grants have provided the principal sources of support for special projects. The Archives of American Art's field collecting activities in Los Angeles, Chicago, and Philadelphia will continue through FY 1988 because of successful fundraising in these geographical locations. In FY 1987, collecting projects in Philadelphia and Rhode Island were completed successfully as a result of funding from The Henry Luce Foundation. In FY 1988, the Foundation's support will allow the Archives to collect materials from other geographical areas. Major grants from The J. Paul Getty Trust and The Andrew Mellon Foundations will underwrite the costs to automate and refine the catalogue of the Archives of American Art collections. In addition, the Archives of American Art Board of Trustees continue to supplement income for the general operations of the Archives through its Wellin Taubman Reserve Fund established in FY 1986.

COOPER-HEWITT MUSEUM

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	30	1,048	19	824	7	1,186	1	982	--	81
FY 1988 Estimate	30	1,076	19	861	7	1,266	1	835	--	50
FY 1989 Estimate	33	1,269	19	897	7	1,274	1	689	--	50

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Since its public debut in October 1976 as the Smithsonian Institution's National Museum of Design, the Cooper-Hewitt Museum has been a pioneer in the innovative exploration of the products and processes of the arts of design: architecture, city-planning, industrial design, interior and theatrical design, textile and fashion design, graphic design, garden and landscape design, crafts and decorative arts. The Museum is a leading international center for the study and interpretive display of the arts of design. For FY 1989, an increase of 3 workyears and \$193,000 is requested for: an assistant curator of drawings and prints (1 workyear and \$35,000); an assistant curator of decorative arts (1 work-year and \$35,000); building maintenance (\$50,000); collections management, data entry services (\$30,000); an accounting technician (1 workyear and \$19,000); and the Columbus Quincentenary (\$24,000).

PROGRAM - The Cooper-Hewitt Museum was founded in 1897 as a working resource, a visual index to the history of the design arts for the use of both students and professional designers. Unlike most traditional art museums, which collected and displayed objects according to hierarchical esthetic values, the Cooper-Hewitt has consistently used its collections as sources of information about the nature and importance of the design process for the benefit of those who are directly engaged in that process and for the public who are touched by it daily in countless ways. The Cooper-Hewitt's approach to collecting, exhibitions, publications, and educational programs has been highly unusual among American museums. The impact of its work has been significant not only in terms of increased understanding of the decorative arts among the general public, but also among leading architects and designers around the world. Inventoried permanent collections number in excess of 167,000 items and include drawings and prints, wall-coverings, textiles, ceramics, glass, metalwork, jewelry and decorative arts produced by European, Asian, and other cultures over a span of 3,000 years. The Museum's specialized library of 50,000 volumes, including 5,000 rare books, is closely related in its subject matter to the objects-collections and comprises a unique resource for scholars and designers alike.

The Cooper-Hewitt has been a bureau of the Smithsonian Institution since 1967. It now occupies a 1902 historic mansion built as the private residence of Andrew Carnegie as well as a smaller, neighboring townhouse, both of which were given to the Smithsonian in 1972 by the Carnegie Corporation as a permanent home for the Museum and its collections.

Federal appropriations for the Cooper-Hewitt have helped to support basic maintenance and security expenses while an overwhelming share of program expenses (exhibitions, publications, and educational activities) have been funded privately with a combination of earned income, grants from individuals, corporations, foundations, and annual allotments of Smithsonian unrestricted trust funds.

Collections Management - Collections management activities are basic, wide ranging, and never ending responsibilities for any museum. At the Cooper-Hewitt, they include: growth of the collections (principally through gifts and only rarely with trust funded purchases); selective refinement of existing collections through carefully managed deaccessioning; creation and subsequent management of accurate catalogue records for newly acquired items, and the continuous upgrading of old records on collection objects; reinventory of the entire permanent collection on a seven-year cycle; storage of collection objects not on exhibition; and, physical processing of all loans into and out of the Museum, including associated record keeping.

The scope of this work is suggested by the more than 600 acquisitions and 1,300 loan transactions handled by the registrar during the first three quarters of FY 1987. In addition, relocation of collection storage areas and the cyclical reinventory required the attention of the registrarial staff. The Museum's Textile and Paper Conservation Laboratories treated nearly 600 objects during the same period, many of which were selected for treatment in the process of preparing one or more future exhibitions.

Important progress in collections management was made during FY 1987 in the vital area of collections related information management. Computer workstations were established in the Registrar's Office and the Department of Decorative Arts, with plans for future installations in the Departments of Drawings and Prints and Textiles. Programs have been designed for loan management and basic cataloguing functions and will be expanded and refined in years to come, to include linkage to related, Washington based systems as a long-term goal.

Acquisitions - In FY 1987, with the assistance of the trust funded Collections Acquisitions Program, the Museum purchased a 13th-century needleworked figure of a Bodhisattva which is believed to have originated in China and was incorporated (probably in the 17th or 18th century) as part of a Buddhist temple banner. This remarkable textile decoration joins other extremely rare Oriental textiles in the permanent collection.

Another major acquisition for FY 1987 was the gift of 46 objects, most in pristine condition, from Barry Friedman and Patricia Pastor, which is the nucleus of a growing industrial design collection. Particularly interesting specimens in this generous gift include the German "people's radio," which was the ubiquitous household receiver for the propaganda broadcasts of Germany's Third Reich, and Ettore Sottsass's "Valentine" typewriter (c. 1969) for the Olivetti company.

Education - The Cooper-Hewitt/Parsons-New School Graduate Study Program in the History of the Decorative Arts is the only formal academic degree granting program currently offered under the auspices of the Smithsonian Institution. Each year since 1982, a group of 15 to 20 students has enrolled for a two-year period of class work, field trips, and independent study in various areas of the history of design and decorative arts. Accredited by the New York State Board of Regents, the Program awards an M.A. degree upon acceptance of a satisfactory thesis and has already become a valuable educational resource for professionals in the museum curation and related fields.

Subscription programs are offered to the Museum's membership community and the general public in four quarters of special classes, workshops, symposia, tours and special events every year. In the first three-quarters of FY 1987, more than 3,800 persons explored topics as diverse as the architecture of ancient Greece and of great American cities, 17th- and 18th-century French decorative arts, the work of pioneering industrial designers of the 20th century, the architecture and design traditions of modern Berlin and Barcelona, a thousand years of Chinese art, the history of the garden, the marine architecture of the twelve-meter yacht, and the graphic design of contemporary comic books.

Publications - Cooper-Hewitt publications are financed exclusively by private funds which represent the earnings generated by previous publications, gifts, and grants from special project sponsors. In addition to several long-term projects, there are continuing series of publications devoted to the design of immovable objects (i.e., not suitable for museum exhibitions by virtue of their nature and size) and modest but informative handbooks on selected groups of permanent collection materials.

Exhibition related publications included an English-German language volume with essays by four German scholars published to accompany "Berlin 1900-1933: Architecture and Design." A similar volume, generated by the exhibition "The Catalan Spirit: Gaudi and His Contemporaries," will feature essays by three American scholars and a Spanish colleague. Both publications have been supported, in part, by a prior-year grant from the J.M. Kaplan Fund, Inc.

Future publishing plans include substantial catalogues projected for important exhibitions devoted to the late 17th-century William and Mary style in Holland, England, and America, and to the design of maps, among other subjects.

Exhibitions - Undoubtedly, most people are aware of the Cooper-Hewitt because of the active and diverse program of changing exhibitions which attract both popular attention and critical acclaim. Working with approximately 11,000 square feet of gallery space, the Museum's exhibitions staff presents roughly twelve to sixteen different exhibitions in four "seasons" each calendar year. The majority of these projects have been generated by the Museum for itself or in collaboration with other interested institutions; some are organized by the Smithsonian Institution Traveling Exhibition Service (SITES), and augmented by the Cooper-Hewitt for their New York showing; others come from outside organizations. For the first three quarters of FY 1987, the Museum had 118,063 visitors and \$165,040 in gross receipts.

Cooper-Hewitt's own exhibitions during FY 1987 included the innovative and highly popular "Milestones: Fifty Years of Goods and Services" which marked the 50th anniversary of the American Consumers Reports Foundation and two samplings of

the Museum's permanent collections to celebrate the Museum's tenth season in the Andrew Carnegie Mansion: "Perspectives: The Illusion of Space" in architectural prints, drawings, and publications, and "Recollections: A Decade of Collecting." Small exhibitions devoted to other aspects of the permanent collections also organized in FY 1987 included "Folding Fans," a fascinating look at over 100 examples of surprisingly seductive, intensely designed objects from Europe and the Orient; "Safe and Secure: Keys and Locks" from ancient to high-tech times; and "Crystal Palaces," a photographic survey which was suggested by the recent discovery of a volume of extremely fine and very rare photographs of London's original 1851 "Crystal Palace," in the Museum Library's rare book room. Major exhibitions were also organized by the Museum on the subjects of modern architecture and design in Berlin and Barcelona, both of which proved very popular with the critics, members and the general public.

Two other important architecture exhibitions also found places in the FY 1987 schedule. These were organized by outside groups and edited by Cooper-Hewitt staff for presentation in New York. "Louis Sullivan: The Function of Ornament" and "Frank Lloyd Wright and the Johnson Wax Buildings: Creating a Corporate Cathedral," represented the work of two of America's most important modern architectural thinkers and builders.

In FY 1988, the Museum will be exploring the design of printed fabrics before 1860, "pop-up" books, corporate annual reports, and celebratory arches, among other subjects. With the assistance of outside curatorial consultants, the Museum will also examine the work of the 20th-century architect Joseph Urban, and the rich traditions of Swedish silversmithing from the 17th century to the present. Also, the Museum will examine a superb group of 18th-century architectural drawings from Swedish national collections which relate to Versailles and illustrate the importance of French taste in Sweden during the fabled reign of the Sun King, Louis XIV.

FY 1989 brings the Tercentenary of the "Glorious Revolution," through which William of Orange and Mary Stuart were brought to the throne of England's deposed King James II. That event was of major significance for the evolution of constitutional government in Britain and her colonies, and to mark it appropriately, Cooper-Hewitt and the Carnegie Museum of Art in Pittsburgh are co-organizing "Courts and Colonies: The William and Mary Style in Holland, England, and America." The exhibition is being assembled by an international team of curatorial scholars and will be seen in both New York and Pittsburgh.

Other projects in planning include the design of money, early 20th-century architecture and design in central Europe, and possibly two very different kinds of design survey as contributions to the Columbian Quincentenary celebrations in 1992.

Capital Campaign Fundraising - The retirement of the director in mid-1987 has prompted a suspension of active fund-raising until a new director is named. Because of the vital role that the director will play in any fund-raising effort of this magnitude, the public announcement of this Capital Campaign will be delayed until a new director is at the Museum. On June 26, 1987, Mary Rose Oaker introduced H.R. 2815, a bill to authorize an appropriation of up to \$15.0 million, an amount which must be matched with privately raised funds. The bill was co-introduced by Messrs. Boland, Conte, Mineta, and Frenzel.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 3 workyears and \$193,000 is requested for: an assistant curator of drawings and prints (1 workyear

and \$35,000); an assistant curator of decorative arts (1 workyear and \$35,000); building maintenance (\$50,000); collections management, data entry services (\$30,000); an accounting technician (1 workyear and \$19,000); and the Columbus Quincentenary Program (\$24,000).

Assistant Curator of Drawings and Prints (1 workyear and \$35,000) - In FY 1989, an increase of 1 workyear and \$35,000 is requested for salary costs to establish a second permanent full-time curatorial position in the Department of Drawings and Prints. This position is necessary to provide required professional services to the public, undertake research on the collections, and insure the proper care and maintenance of the collections. At present, there is one curator and two museum technicians who are responsible for over 113,000 objects (the Museum's total inventory is over 167,000 objects) in the drawings and print collection which range from 17th- and 18th-century Italian drawings and French prints to 19th-century American art by masters such as Homer, Church and Moran. In comparison, the Smithsonian's National Museum of American Art has a graphics collection of approximately 20,000 objects, devoted solely to American prints, drawings and photographs, and three permanent, full-time curators.

Although only a small fraction of the permanent collection may be on exhibition anywhere at a given time, this is a world-renowned working collection and as such, there are many inquiries, both from scholars, the design community, and the general public, which require the expertise and knowledge of a curator who is intimately familiar with the collections. In addition, a curator must conceive, research, and produce exhibitions based on the collections; approve loan requests; catalogue collection objects; identify objects for acquisition and deaccessioning; and produce catalogues, books and essays based upon original research. Despite the energy and devotion of the current curator, the considerable scope of responsibility has resulted in cataloguing backlogs including a widespread need for more thorough information to incorporate the findings of recent scholarship with existing records.

It is critical that the Museum add another professionally trained curator to the staff so that more than just basic maintenance and minimal scholarship (in the form of exhibitions and publications) can be done with the collections. If Federal funding for this curatorial position is not approved, the Museum will continue to suffer indefinite delays in the cataloguing and publishing of existing holdings together with crippling constraints upon our ability to enhance them through prudent acquisitions.

Assistant Curator of Decorative Arts (1 workyear and \$35,000) - In FY 1989, an increase of 1 workyear and \$35,000 is requested to establish the position of assistant curator in the Decorative Arts Department in order to permit much needed collection based and related research activities to proceed effectively.

As in the Drawings and Prints Department, there is only one professional curator on the Cooper-Hewitt staff in the Decorative Arts Department. Although the decorative arts collection (15,000 objects) is considerably smaller than the drawings and print collection, the collections include objects of many different materials and types. In addition to objects of glass, ceramics, wood, and metal, there are architectural embellishments, objects of use, jewelry, and furniture. An assistant curator would provide additional areas of expertise complementing those of the present curator and this, in turn, would inspire new approaches and insights to the collection in terms of research (which would be manifested through exhibi-

tions and publications) and educational and public outreach. A second museum professional in the department would also provide assistance in the management of the decorative arts collections, including approval of loan requests, public inquiries, identification of objects for acquisition and deaccessioning, cataloguing the collection, liaison with craft and decorative arts collections elsewhere within the Smithsonian Institution, and development of new courses for the graduate degree program as well as other outreach initiatives. In addition, it would be possible for the curators to undertake in-depth studies such as the phenomenon of revivalist styles in the 19th century or a study of the iconography of marine life forms found in the decorative arts.

The decorative arts collection is a working collection and without an assistant curator, there will continue to be limited access to the collections by the many design professionals and crafts persons who use the collections for ideas and inspiration. In addition, the press of the collections management responsibilities would continue to restrict the time available for research on the collections, resulting exhibitions and publications.

Building Maintenance (\$50,000) - For FY 1989, an amount of \$50,000 is requested to offset increasing costs connected with basic building operations and maintenance expenses for the mansion and the townhouse, both of which house the collections of the Cooper-Hewitt. This request of \$50,000 will be used to supplement current base funds by contracting for janitorial services for the public and non-public areas of the Museum. Currently, the base of \$400,000 is insufficient to fund these needs due, in part, to across-the-board budget reductions in past years and higher than average inflation rates affecting the costs of supplies and services in the New York City area. As a result, maintenance has deteriorated in non-public areas and essential service contracts for routine care, such as one for window cleaning, have had to be eliminated. Additional support for essential maintenance is particularly vital to prevent the further physical deterioration of the historic mansion building which was constructed in 1902. The management and care of the collections and maintenance of the Museum's buildings are basic Institutional commitments and are firmly supported by the Secretary.

Collection Management Data Entry (\$30,000) - In FY 1989, an increase of \$30,000 is requested, above a base of \$25,000, for the purchase of commercial data entry services to support the Museum's systematic efforts to modernize its record keeping and management systems for collection based data.

An automation plan prepared by the Museum, will guide the current and future use of hardware and the coordinated development of programs and resources in keeping with sound management principles, and assure compatibility with Institutional planning and implementation of similar systems in the Washington based bureaus. The Collections Reference System and related collections management applications have been principle elements of the Cooper-Hewitt plan from its inception. By FY 1989, the capability to initiate the transfer of data from existing records and to receive original data on collection objects as they are acquired into an automated database will be in place. What is needed, however, is the capacity to execute the extensive data-entry workload. Curators and technicians will be generating and reviewing data, but they cannot possibly transfer the necessary information on more than 167,000 objects without adequate support. For the first year, the increase of \$30,000 will purchase approximately 2,000 hours of such support annually from commercial word-processing and keypunch agencies at \$15-\$20 per hour.

Until the one-time transfer process actually begins, it is difficult to project its pace and duration, but the Museum's other data-entry requirements for current cataloging and related collection management applications will certainly be a permanent need and very likely a growing one. Without funds to pay for such work, the Museum will be unable to take advantage of the technology it has been developing and will be forced to continue to defer a solution to its collection information problems (which will therefore grow larger with each passing year). In order to achieve even piecemeal progress in this program, existing staff would have to curtail their professional activities in one or more areas.

Accounting Technician (1 workyear and \$19,000) - In FY 1989, an increase of 1 workyear and \$19,000 is requested to hire an accounting technician in the Museum's Business Office. Because of the Museum's location away from centralized Smithsonian accounting services, and the multiplicity of its programs and activities, the Business Office is required to execute an unusually long list of financial and other functions which are essential to the efficiency of the organization's day-to-day operations and to the required reporting relationships and procedures which link the Museum to central accounting and related offices in Washington, D.C.

One manager and one accounting technician are currently on-board. Without the assistance of an additional accounting technician, the Museum will be unable to pursue the further economies which are possible through continuing decentralization of accounting, personnel, procurement and other systems; will continue to risk major disruption of relationships with vendors and donors as well as accountability to central Smithsonian offices; and will be unable to improve in-house analyses and control mechanisms. Considering the extent to which Cooper-Hewitt must function independently with respect to daily funds management, contracting, procurement and related financial activities, a second accounting technician is urgently needed.

Columbus Quincentenary Program (\$24,000) - For FY 1989, an increase of \$24,000 is requested to permit the Cooper-Hewitt Museum to begin a Quincentennial project to conduct a survey of the ways and means by which Native American arts have inspired and affected the architecture and design arts of Western Europe and North America from the 16th century to the present.

One research assistant, under the guidance of the curator of the Decorative Arts Department, will explore the continuing appeal exerted by the ceramics, textiles, metalwork and architecture of Native American cultures of the western hemisphere for mainstream architects and designers of Europe and North America, with particular attention to the 19th and 20th centuries. Such an exhibition would be an unprecedented opportunity to discover important relationships and influences between elegant pottery traditions of South America and English 19th-century art pottery, metalwork from Central American cultures and the New York City Studio of Louis Comfort Tiffany, and the architectural forms of pre-Columbian sites and the innovations of Frank Lloyd Wright, among others.

This project has unusual scope and will involve a variety of cultural traditions. It will also involve joint research with domestic and foreign academic and museum enterprises, a direction the Secretary encourages the Smithsonian to pursue for FY 1989. Contractual consultation by one or more outside experts will be required for a period of three years.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are derived from a variety of sources including museum shop sales, product development, membership and admissions fees, donations, fund-raising events, and allotments. The allotments support salaries of the director, administrative officer, and various staff members and help defray expenses associated with special events such as exhibition openings. Special Purpose Funds are used to support educational programs, exhibitions and publications for the Museum.

Restricted Funds - These funds are provided for specific purposes from grants, bequests, and other donations from individuals, organizations, and corporations. In FY 1988 and FY 1989, these funds will support exhibitions such as "Courts and Colonies: The William and Mary Style in Holland, England, and America," and assorted smaller projects.

Government Grants and Contracts - These funds are provided by various government agencies and departments for specific program support. The Museum annually seeks funding in varying amounts from the New York State Council on the Arts for exhibition support and other programs. Requests for seven separate projects were submitted for possible funding in FY 1988.

NATIONAL MUSEUM OF AFRICAN ART

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	51	3,124	2	185	3	1,171	--	236	--	--
FY 1988 Estimate	56	3,401	2	74	3	265	--	313	--	--
FY 1989 Estimate	58	3,485	1	47	3	232	--	595	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The National Museum of African Art is the only museum in the United States devoted to the collection, preservation, research, exhibition, and interpretation of the visual arts of Africa. Founded in 1964 as a private non-profit institution, the Museum became a bureau of the Smithsonian Institution in August 1979 following the enactment of Public Law 95-414. In December 1986, the Museum moved from its original Capitol Hill location to its new facilities on the Mall as a part of the Quadrangle complex, which will open to the public on September 28, 1987. For FY 1989, an increase of 2 workyears and \$84,000 is requested to develop the Museum's ethnographic conservation capability, particularly the conservation of metalwork (1 workyear and \$44,000); and to further the development of the Eliot Elisofon Photographic Archive (1 workyear and \$40,000).

PROGRAM - As the only museum in the United States devoted to the collection, study and exhibition of African art, the National Museum of African Art (NMAfA) endeavors through the visual arts to instill an appreciation and understanding of the diverse cultures in Africa south of the Sahara. Although the Museum's primary emphasis is on the traditional cultures of the sub-Saharan region, it also studies and exhibits the ancient and contemporary arts of the entire continent. The Museum develops and presents a variety of interpretive programs including exhibitions, lectures, gallery tours, classes, workshops, audio-visual presentations, and publications. Each program endeavor is motivated by the esthetics of traditional African art, and the Museum actively cooperates and coordinates its activities with those organizations and institutions whose purposes are complementary.

Funding provided in FY 1985 through FY 1987, and requested in FY 1988, will enable the Museum to continue to strengthen its staff and support the expanded exhibition, research, acquisition and education programs developed for its new Mall facilities.

Research - The continuation of the program of scholarly publications and exhibitions, begun by the Museum for its inaugural in 1987, is a most important

aspect of ongoing research in the Museum as well as public education. With funding requested in FY 1988, the Museum will hire an assistant curator for Central African art. The addition of this position will provide curatorial specialization for the major sub-Saharan geographic/cultural regions--West, Central, and Southern/Eastern --that are represented in the Museum's collections.

Current projects leading toward future exhibitions and/or publications include research on the arts of the East African coast including those of the Swahili-speaking peoples; a working symposium on the arts and architecture of Nomads leading to a major publication and exhibition; research toward an exhibition and publication of a corpus of cast copper-alloy sculptures from southern Nigeria, the so-called 'Lower Niger Bronzes'; and a working symposium on the arts of the Luba complex, a large and important group of peoples in eastern Zaire.

In addition, a catalogue is planned to accompany the exhibition of African pottery being researched and planned by the Museum's curatorial department. The variety of ceramics from sub-Saharan Africa will be surveyed according to utilitarian or ritual uses, types of objects, and styles. Since pottery is most often made by women, this exhibition and catalogue will be an important work concerning the contribution of women to the artistic heritage of Africa.

Since FY 1986, the Museum has awarded post-doctoral residence fellowships. This residence fellowship program in the humanities, administered by the Smithsonian's Office of Fellowships and Grants, was made possible by a grant from the Rockefeller Foundation. Enhancement of the Museum's fellowship and internship program continues; and in FY 1988, the third fellow in residence, Dr. Herbert Cole, University of California, Santa Barbara, will conduct research on "Archetypes of African Sculpture." This topic is a continuation of a series of studies and small exhibitions he has undertaken in California. He will bring the several themes of this topic into a single focus. These themes including the primordial couple, woman and child, the powerful male figure, and the equestrian figure appear frequently in the sculpture of sub-Saharan Africa but have never been drawn together for study or exhibition. A working symposium is proposed to plan an exhibition and the accompanying publication for "Archetypes."

To foster international cooperation and exchange, planning will begin in FY 1988, for a major gathering of African art scholars in the spring of 1989. The African Art Triennial has taken place every three years since 1968, and it is the most important conference of African art specialists, bringing together leading American, European and African scholars.

The Eliot Elisofon Archives, a major research component of the National Museum of African Art, is one of the largest archives in existence on African art, culture and environment. Its holdings number nearly 150,000 color slides, over 70,000 black and white photographs, 120,000 feet of unedited film footage and 50 feature films. These holdings were substantially enriched in FY 1987 by the donation from Dr. Christraud Geary of over 8,000 duplicate photographs, primarily vintage black and white prints but also duplicate color slides of Dr. Geary's fieldwork in the Cameroon. Also noteworthy among the Archive's recent acquisitions are 166 duplicate color slides from Veronique Vanomilier's fieldwork among the Luba people in Zaire.

In FY 1987, the staff of the archives responded to an extraordinary volume of staff requests for slides and prints needed for the intensive research conducted

for the inaugural exhibitions. Although closed to the public as a result of the move, duplicates of slides and prints were also provided in response to telephone requests from students, scholars, universities, museums and other organizations.

The National Museum of African Art Branch of the Smithsonian Institution Libraries (SIL) system, as one of the major African art library collections in the world, provides bibliographic reference and research support not only for the staff of the Museum but for national and international scholars, including those from Africa. As a result of a major multi-year acquisition program, the library collections reached a projected level of 15,000 volumes and approximately 300 periodical titles in FY 1987. The Library expects to continue to develop its collection to serve the expanded research needs of the Museum. The Library continues an active outreach program through the publication and distribution (free of charge) of the monthly Library Acquisitions List now going to about 400 individuals and institutions world-wide.

Exhibitions - The Museum will present five inaugural exhibitions for the public opening of its new facilities in September 1987. "Patterns of Life: West African Strip-Weaving Traditions" will trace the stylistic and technical development of this West African weaving tradition. "African Art in the Cycle of Life" will illustrate the role of the arts in traditional African life. "The Permanent Collections of the National Museum of African Art" will highlight some of the more recent acquisitions of the Museum, many of which have never before been exhibited. "Royal Benin Art in the Collection of the National Museum of African Art" will feature 22 bronze objects from the ancient kingdom of Benin (Nigeria) in the Museum's collections. "Objects of Use" will illustrate artists' creative use of materials and economy of means in nonfigurative utilitarian objects.

With the opening of these five inaugural exhibitions on September 28, 1987, the Museum initiates an expanded exhibition schedule for its new facilities. Funding requested in FY 1988 will establish an expanded base for the projected costs of the special handling and shipping requirements necessary for the international shipment of art objects for the major loan exhibitions planned for the future.

As outlined in the Secretary's area of emphasis to strengthen joint programs and ties with other museums in areas of common interest, temporary exhibitions proposed for FY 1988 include a major loan exhibition with accompanying catalogue, in collaboration with The British Museum, of a group of ancestral screens of the Ijo of the Niger Delta, which are among the most distinctive sculptures of Nigeria; "The Essential Gourd: Art and History in Northern Nigeria," organized by the Museum of Cultural History, University of California; and "Shoowa Textiles," a major private European collection of textiles from south central Zaire, circulated by the University of Michigan Art Museum, Ann Arbor.

Also planned for FY 1988 is "The Art of African Exploration," a selection of 34 handsomely illustrated 19th-century books recently acquired by the National Museum of African Art Branch of the Smithsonian Institution Libraries. Lithographs, aquatints and steel engravings illustrate these records of the experiences of explorers, missionaries, travelers and traders during the 19th century exploration of the African continent.

In FY 1989, the Museum plans to present "African Gold," a collection of precious objects assembled by the Barbier Mueller Museum, Geneva, Switzerland, and

circulated in the United States by the American Federation of Arts; "African Pottery," a survey of ceramics from various sub-Saharan African societies, organized by the National Museum of African Art; and "African Musical Instruments," organized and circulated by the American Federation of Arts.

Education and Public Orientation - The National Museum of African Art develops and presents programs for a broad and varied public audience, both within and outside the Museum, to promote increased public awareness and understanding of other cultures. Interpretive programs such as lectures, films, gallery talks, tours and workshops supplement information provided by exhibitions and offer a range of opportunities and incentives for learning about Africa and its artistic heritage. A computerized system will be put into effect in FY 1988, enabling the department to schedule a greater number of programs to keep pace with anticipated increased program requests.

During the period that the Museum was closed to the general public in FY 1987, more than 200 outreach programs were scheduled and presented to schools, hospitals and senior audiences, reaching over 10,000 participants. During FY 1988, outreach programs will continue to be offered to make the resources of the Museum available to groups who cannot come to the Mall.

In July 1987, the Department of Education and Research in conjunction with the Office of Elementary and Secondary Education offered a course for K-12 teachers titled "African Art in the Classroom," which was attended by more than 20 teachers. A new series of Teacher Workshops to be offered in FY 1988 will enable teachers of all grades to integrate museum tours and other programs into their curricula. Topics for scheduled Teacher Workshops include current exhibitions as well as more general subjects such as "The Social Context of African Art" and "What Makes it Art?"

As part of the inaugural activities in conjunction with the opening of the Museum's new facilities, a symposium on "The State of the Discipline of African Art Studies" will be held on September 16, 1987, with expected attendance by more than 500 persons. In FY 1988, a symposium on "Design and Color Symbolism in West African Strip Woven Cloth" will be presented. Papers from both symposia will be published during FY 1988.

To widen its educational and museum outreach programs, the Museum also sponsors academic courses in African art in conjunction with other Smithsonian programs and outside institutions. In FY 1988, courses will be offered through the Smithsonian Resident Associate Program and through Georgetown University's undergraduate program and its School for Summer and Continuing Education.

The Museum's docent training program ensures that knowledgeable volunteer guides are available to conduct tours and other Museum programs. To strengthen visitor experiences, 30 docents were trained in FY 1987 to present outreach programs and 25 docents were recruited and trained to present weekday tours.

During FY 1987, the Museum's public affairs office distributed complete background information about the Museum's inaugural exhibitions and programs to local, national and international press. A general Museum brochure was produced as well as a calendar of events that will be mailed quarterly to the Museum's full mailing list of over 10,000 names.

Collections Management - During FY 1987, the Collection Management staff of the Museum developed and implemented a thorough, well-documented plan for the move of the permanent collection of over 6,000 objects to the Museum's new facility. Computerized inventory records were refined; a flexible ongoing inventory control system was devised to ensure specific object locations during and after the move; packing and handling specifications were developed to ensure the safety of the objects; and after the move was completed, equally careful attention was paid to unpacking and storage organization. Each object was placed in its pre-designated permanent storage location and the computerized inventory/location files were verified and updated.

For the first time in the Museum's history, a photographer is now on staff to record systematically the collection holdings. This work is essential to collections management and there is a severe backlog that can now be addressed. The photographic studio, which began operations in April 1987, processed 120 photographs of primary works of art in the collection during its first three months, many of which will be published.

The Museum has in its new facility a state-of-the-art conservation lab for the care and treatment of ethnographic art. With equipment such as a central vacuum system; an X-radiography unit; a stereo microscope and polarizing light microscope with reflected and transmitted light capacities for material analyses and objects treatment, the Museum was able, in FY 1987, not only to begin systematically to treat its collections, but also to establish programs that offer laboratory experience for undergraduate and post-graduate conservation students. Throughout FY 1987, the staff of the conservation department examined all objects to be included in the inaugural exhibitions. In addition, procedures were established for complete conservation care of the Museum's varied collections and conservation treatment needs were prioritized.

Development of Collections - The Museum continued to work steadily to acquire objects of the finest aesthetic quality to strengthen its holdings. An active acquisitions program, through both gifts and purchases, remains one of the Museum's highest priorities and must continue to be to support the Museum's expanding research, exhibitions and public programs.

Particularly noteworthy gifts include a collection of 13 objects from various sub-Saharan regions--notably seven masquettes from the Sisala people of Burkina Faso and an Asante ladle from Ghana. In addition, the collection was enriched through gifts of a Fang reliquary guardian head from Gabon, a Kente textile from Ghana and a Somali headrest. Through purchase, the Museum acquired a superb example of a fired clay vessel from Malawi. A grant from the James Smithson Society supplemented Federal funds to make possible the acquisition of a figure from the Asante people of Ghana believed to ensure human fertility and the health and beauty of a child. This rare work is a complex double image carved from a single block of wood and one of no more than a half dozen carvings of this particular type.

Automation - The Museum began to develop an automation capability with funding provided in FY 1986 and FY 1987. To date, the Museum has acquired 24 workstations, with necessary software, and has provided for staff training, the use of the central computer system and equipment maintenance. Funding requested in FY 1988 will provide an expanded base of \$90,000 to purchase additional hardware and software for the design and collections management department and will permit the

establishment of a cyclical replacement program for automation equipment. A new position for a computer specialist has also been requested in FY 1988 to assist in the development of automation systems for research, public information, education and publication programs, and to provide more efficient administrative support in financial management, procurement and personnel services.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 2 workyears and \$84,000 is requested to develop the Museum's ethnographic conservation capability, particularly the conservation of metalwork (1 workyear and \$44,000); and to further the development of the Eliot Elisofon Photographic Archive (1 workyear and \$40,000).

Conservation and Scientific Testing (1 workyear and \$44,000) - Before moving to its new facilities in the Quadrangle, the National Museum of African Art did not have space or sufficient equipment for a conservation laboratory. As a consequence, there is a severe backlog of material to be treated and the need for continuous monitoring of the 6,000 objects in the permanent collection. A large proportion (approximately 1000 objects) of the permanent collection are metal objects that are in need of both treatment and analysis. Without additional support for this aspect of our program, existing deleterious chemical conditions will continue to damage significant segments of the collection.

For FY 1989, the addition of an assistant conservator (1 workyear and \$29,000) to the current staff of two (consisting of a chief conservator and an assistant) is requested to ensure adequate staff to carry out scientifically established treatment procedures. This additional conservator will ensure that systematic treatment of the entire permanent collection proceeds at a reasonable pace, as well as allow the Museum to conduct the required conservation work on loan objects to prepare them for exhibition. With a staff of three, it is anticipated that it will take at least two to four years just to stabilize the collections, before further conservation work and analysis can begin.

While the new conservation laboratory is exceptionally well equipped, and spot testing to determine the qualitative composition of metals can be done, the lab does not have the equipment to mount samples for microscopic analysis. A sum of \$7,000 is requested to purchase specialized equipment, such as a Beuhler mounting press and grinding wheels, for use in the mounting of samples. This equipment is also required to conduct analyses for a proposed co-organized exhibition with the British Museum on a corpus of Nigerian metalwork, a recently identified metallurgical tradition in which very little research has been conducted, and to carry out systematic research on the Museum's 21 cast copper-alloy Benin (Nigeria) objects (transferred to NMAfA from the Hirshhorn Museum and Sculpture Garden in FY 1986). This project relates to one of the Institution's areas of emphasis to increase bureau flexibility and responsibility for development of and response to research initiatives and strengthens the Museum's ties with other enterprises, domestic and foreign, in areas of common interest.

Since metallography is a highly complex specialty, a project of this magnitude requires consultation with an expert in this field during the initial planning phase and, after the technical work has been completed, for specific interpretation of the results of the sampling. A sum of \$8,000 is requested to contract with outside conservation experts who have specialized knowledge to conduct these analyses.

In FY 1990 and following years, the funding for scientific testing and equipment will be retained to purchase additional specialized supplies and equipment. Additional funding to begin the publication of a conservation bulletin is anticipated to be requested in FY 1991.

Development of Photographic Archives (1 workyear and \$40,000) - The Eliot Elisofon Photographic Archives in the National Museum of African Art is one of the largest archives in existence on African art, culture and environment. Its holdings now number 150,000 color slides and 70,000 black and white photographs, as well as 120,000 feet of unedited film footage and 50 feature films.

While there are many small photographic archives in existence, their focus, unlike that of the Museum, is extremely limited. For this reason, the Museum's archival holdings are constantly in demand by scholars throughout the world as well as by staff in support of the Museum's exhibitions, education, and curatorial research programs. Further, many United States and European researchers in anthropology and the fine arts have expressed the need for a central repository for their field photographs and slides, and their hope that the National Museum of African Art will fully assume this important role. Given the importance of this research resource, the Museum must systematically move the development of the Archive forward. Present indexing capability must be strengthened and revised and a comprehensive catalogue developed which can provide the kind of conceptual framework that scholars expect.

Currently, base funding of \$57,000 provides for a staff of two (consisting of an archivist and an assistant) and necessary support costs for the department. For FY 1989, an increase of 1 workyear and \$40,000 is requested to further the development of the Archives as one of the most important pictorial resources in the United States. This project relates to the accomplishment of the Institution's areas of emphasis in research by serving scholars within and outside the Institution, thus strengthening ties with other academic and research organizations.

The requested increase will allow the Museum to hire an archivist (1 workyear and \$35,000) with specialized knowledge in the art history of Africa. A major responsibility of this position will be to develop and establish catalogue procedures for the archival collections, based on the unique context of African art history. As the Archives grows during the next five year period, the Museum must also consider how technology can begin to further research and increase its effectiveness. It is expected that the new archivist position will also provide the leadership necessary to move the Archives in this advanced technological direction. A sum of \$5,000 is also requested for additional archival supplies and materials. This funding will be retained in FY 1990 and following years.

Without this requested position, the Archives as a research resource cannot be effectively accessed. This means that incoming acquisitions as well as the current substantial holdings can serve only limited scholarly or public use.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are derived from the Museum's share of sales in the museum shop, courses conducted in cooperation with Washington metropolitan area public education institutions, and allotments. They are used to provide additional support for the Museum's education and collections acquisition programs, exhibition openings, and travel costs associated with

meetings of the Museum's Commission. In FY 1988, allotments will be provided to support the salary costs of one employee.

Restricted Funds - These funds are contributed for special purposes in the form of grants and gifts from individuals, foundations, organizations or corporations for specific purposes. A grant from the Shell Companies Foundation in FY 1987 provided funds for the Museum's educational and scholarly programs, and subsequent grants are anticipated for FY 1988 and FY 1989. A grant for a planning conference has been given by The Rockefeller Foundation for an exhibition on nomadic art and architecture.

Two grants received from the Women's Committee of the Smithsonian National Associate Program will enable the Museum to publish the symposium papers, "African Art History: the State of the Discipline" and will provide speakers' honoraria for the symposium "Design and Color Symbolism in West African Strip Woven Cloth."

The Museum will continue to seek additional funds from private sources to strengthen its permanent collection.

ANACOSTIA MUSEUM

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	19	913	1	45	--	--	--	--	--	--
FY 1988 Estimate	19	931	1	44	--	--	--	--	--	--
FY 1989 Estimate	21	1,001	1	44	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Anacostia Museum, which is located in the southeast section of Washington, D.C. (approximately six miles from the Mall), serves as a national resource for exhibitions, scholarly and applied research, historical documentation, and interpretive and educational programs relating to black history and culture in America. Founded in 1967, the Museum will celebrate its 20th anniversary in 1987. For FY 1989, an increase of 2 workyears and \$70,000 is requested to strengthen and expand the Museum's research support by hiring a registrar and a librarian.

PROGRAM - Presenting American history from a multi-ethnic perspective (with a focus on black contributions) through its research, exhibition and educational/interpretive activities, the Anacostia Museum is a national prototype for scholarly and applied research, historical documentation, exhibition, and interpretive and educational programs relating to the experiences of black Americans and their contributions to science, history and the arts. The Anacostia Museum works with other Smithsonian museums and programs in researching and exhibiting subjects related to black history and culture. Established as a cultural resource for the people of Anacostia, the Museum has developed into a museum on Afro-American history and culture, serving as a valuable source of materials on black American history for other museums and organizations and of innovative ways for introducing nontraditional museum audiences to the worlds of science, history, and the arts. The Museum is an active member in several professional museum associations, including the American Association of Museums and the African American Museums Association, and works with other museums and research institutions, universities, and archives throughout the United States to enhance the awareness and appreciation of the contributions of black history and culture to American society.

Research - In FY 1987, research continued in conjunction with the development of three exhibitions to be presented at the Museum in FY 1988 through FY 1989. The results of research on the vital role that the black church played in developing black communities, conducted by the Museum since FY 1984, will be presented in a

major exhibition, "Climbing Jacob's Ladder: The Rise of Black Churches in Eastern American Cities, 1740-1877." Anacostia research staff contacted and visited individual congregations and major repositories of church records in Savannah and Augusta, Georgia; Nashville and Jackson, Tennessee; Salisbury, Raleigh and Chapel Hill, North Carolina; Charleston, South Carolina; Philadelphia, Pennsylvania; New York, New York; Boston, Massachusetts; and Richmond, Virginia. This research project has attracted much enthusiastic support and interest from the academic and museum communities. A publication will complement the exhibition and make available new and significant research data compiled during this project to scholars in the fields of black history and church history.

Research on Prentice H. Polk (1898-1985), a photographer whose documentation of southern folklife extended for more than half-a-century, has resulted in bringing together, for the first time, a reservoir of varied knowledge about this consummate artist whose national recognition came during the last decade of his life. In FY 1988, the exhibit script will be developed and preparation of the accompanying exhibit catalogue will begin. The catalogue will include biographical data concerning P.H. Polk, a listing of all known Polk exhibits, and an expanded record of bibliographical data compiled during the research.

Also during FY 1987, research on black inventors continued, with the development of an exhibit script for "A Continuing Tradition: Afro-American Contributors to American Technology." The exhibit and accompanying catalogue will focus on black craftsmen's relationship to developing technology, innovative and inventive techniques they brought to their work, and the major social and cultural issues that formed the context within which they worked.

Exhibitions at the Museum - The new exhibition gallery at the Museum's Fort Stanton Park facility opened on May 17, 1987, with "Contemporary Visual Expressions" as the inaugural exhibition. Presenting the works of four contemporary black American artists: Sam Gilliam, Martha Jackson-Jarvis, Keith Morrison, (all of Washington, D.C.) and William T. Williams (from New York City), this exhibition was curated by famed art historian, Dr. David C. Driskell, professor of art at the University of Maryland. "Contemporary Visual Expressions" interpreted the personal and collective aesthetics of these artists whose content was derived from African and Caribbean visual experiences, neoplasticism and color field painting, abstract expressionism, and African lore and religion. The exhibition has been well received by the public.

"Climbing Jacob's Ladder: The Rise of Black Churches in Eastern American Cities, 1740-1877" (which is scheduled to open in October 1987) will document the importance of black churches in 18th- and 19th-century urban life through the presentation of artifacts and archival materials from active congregations and major repositories in eight states. Approximately 150 artifacts ranging in size from church pews to tiny hymn books will be on display, including: a pulpit belonging to Lott Carey, a Virginia slave who became an early 19th-century missionary to West Africa (from the First African Baptist Church of Richmond, Virginia); a reed organ of rare construction dating from 1864 (from the Bethel A.M.E. Church in Baltimore -- one of the oldest black congregations in America); and an extremely rare 19th-century hymn book (from the United Library of Garrett-Seabury Theological Seminaries at Evanston, Illinois), which was the first hymn book compiled by a black American (Rev. Richard Allen) and the first hymn book compiled specifically for a black congregation (the Mother Bethel Church in Philadelphia).

A second exhibition to be presented in FY 1988 will be a show by the D.C. Art Association, highlighting works by artists from the Washington metropolitan area (scheduled to open in May 1988).

Artifacts, documents and manuscripts, photographs, and other visual images have been located for the exhibition, "A Continuing Tradition: Afro-American Contributions to American Technology," (scheduled to open in September 1988) and negotiations with lenders are under way for the loan of artifacts to be used in the exhibition. Several outstanding artifacts have been located, including an original patent model from the Cliff Petersen collection and two full-scale demonstration models of a stop light and a gas mask invented by one of the foremost black inventors, Garrett Morgan.

"P.H. Polk: The Man and His Work" (scheduled to open in June 1989) will feature Prentice Polk's photographic documentation of 20th-century southern folklife and include vintage and signed prints from the P.H. Polk estate, Tuskegee University Archives, private lenders, and galleries. Videotape excerpts of television interviews with Polk conducted by NBC, CBS, and Metromedia News will also be presented as part of the exhibit.

Traveling Exhibitions - The Anacostia Museum has produced several traveling exhibitions related to the history, culture, and achievements of black Americans, including "Out of Africa"; "The Frederick Douglass Years"; "Black Women: Achievements Against the Odds"; and "Mary McLeod Bethune and Roosevelt's Black Cabinet." These traveling exhibitions, circulated by the Museum and by the Smithsonian Institution Traveling Exhibition Service (SITES), allow the Museum to reach a diverse national audience. A recent brochure distributed by SITES, "Black History and Ethnic Studies Exhibitions from the Smithsonian Institution," highlights 16 SITES exhibitions currently available for travel, including "Black Women" and "Out of Africa," that are of particular interest to institutions looking for traveling exhibitions in these fields.

"Black Women: Achievements Against the Odds" profiles the lives, careers, and accomplishments of 200 black women, including Madame C.J. Walker (America's first black millionaire) and Edmonia Lewis (one of the first black female American artists to gain international recognition). "Out of Africa" documents the early chapters of black history, including the slave trade from Africa, slave life in the American colonies, and the abolition movement. During FY 1987, "Black Women" was exhibited at five locations, including Pennsylvania State University in University Park, Pennsylvania; Parthenon Galleries in Nashville, Tennessee; and the New York State Fair in Syracuse, New York. "Out of Africa" was also exhibited at five locations including presentations by the Hawaii Committee for the Humanities, in Honolulu, Hawaii; Tupelo Art Gallery in Tupelo, Mississippi; and the California Museum of Afro-American History and Culture in Los Angeles, California.

The paper panel exhibition based on the "Black Women" traveling exhibition has become one of SITES' most popular paper panel shows. These shows, which are offered for sale for \$200, summarize material presented in the larger exhibitions and combine illustrations, photographs, and text printed on heavy poster paper. Their flexibility, durability and low cost allow small museums and other organizations to make these exhibitions available to diverse audiences throughout the United States.

Public Education and Orientation - During FY 1987, the Museum conducted a workshop on Kwanza and a Black History Month Planning Clinic. "The Renaissance: Black Arts of the Twenties" exhibit was highlighted by a vintage film series; a demonstration by Georgette Seabrooke Powell, a well-known WPA artist, who talked about the renaissance artists she knew; gallery talks on visual artists of the twenties; and poetry readings of work by Sterling A. Brown, a poet laureate, author, and educator. During the month of December 1986, storyhours, African drumming and dancing, films, and a Lunch Bag Forum in which Richard Powell, a predoctoral fellow at the National Museum of American Art, spoke on renaissance painter William H. Johnson, highlighted the final days of "The Renaissance" exhibition. "The Renaissance" exhibition was the last exhibition to be presented at the Museum's location in the Carver Theater building, which was closed at the end of 1986.

Following the opening of the new exhibition gallery at the Fort Stanton Park facility, the Museum continued the Lunch Bag Forum series with talks by artists Sam Gilliam and Keith Morrison, whose works are on display in the "Contemporary Visual Expressions" exhibit. A "Meet the Artist" series brought five local artists to the museum for demonstrations and informal talks, and a Creative Arts Workshop drew young people to early morning classes.

On June 14, 1987, over 400 people from the Washington metropolitan area attended a community "Family Day" program at the Museum. This program, supported by a grant from the Smithsonian Institution Women's Committee, was intended to introduce the Museum to Washington area residents who had not previously been familiar with its programs.

Community Relations: As part of the Museum's effort to introduce its programs and activities to its new community and to strengthen existing relationships, Anacostia Museum staff conducted on-site visits or conferences with the property manager and residents of the Woodland Terrace housing development; Roving Leaders staff members; Allen A.M.E. Outreach Program; Stanton Road and Alabama Avenue public libraries; and the museum liaisons at Our Lady of Perpetual Help and Savoy Elementary Schools. Additionally, presentations about the Museum were made at a joint meeting of the Moten-Johnson-Wilkinson faculty meeting and the Johnson Junior High School Far Southeast Career Center.

On the citywide level, Museum staff spoke at a departmental meeting of social studies teachers on "How to Use the Resources of the Anacostia Museum." There are currently tentative plans to sponsor a citywide seminar for social studies teachers and community residents on the black church. The Museum is also currently planning the development of a community seminar on the "Climbing Jacob's Ladder" exhibition during the fall of 1987.

Museum Facilities - In May 1987, the Anacostia Museum opened its new public exhibition and education facilities at Fort Stanton Park. In addition to consolidation of its facilities, the expanded facility provides better visitor accommodations, including off-street parking. Inaugural festivities included an invitational breakfast held on May 15, 1987 and a ribbon cutting ceremony and opening reception for the inaugural exhibition on Sunday, May 17, 1987. More than 1,700 people attended the inaugural exhibition opening.

Over the next few years, the Museum plans to initiate the development of a master plan to determine the long-range space needs for its research, exhibition

and public service programs. Based on the results of this master plan, the Museum will evaluate different alternatives for future facilities development, including the possible relocation of the Museum to National Park Service land at Poplar Point, located near the future Anacostia MetroRail Station on the Green Line.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 2 workyears and \$70,000 is requested to continue strengthening and expanding the Museum's research support by hiring a registrar and a librarian.

Since its founding in 1967, the Anacostia Museum has documented the history and culture of black Americans and their significant contributions to the diverse and rich heritage of this nation. Established as a cultural resource for the people of Anacostia, the Museum has grown over the past several years into a national resource for research and for interpretive and educational programs relating to black history and culture in America. Due to the lack of a permanent museum collection and the small size of its collection of research material, the Museum does not have either a professional museum registrar or librarian. The requested increase would allow the Museum to professionalize its research support in these fields.

Without a registrar on staff, the Museum's research staff has had to take on these registrarial duties. However, when needed, the Museum sought support from elsewhere--including the National Portrait Gallery, the National Museum of American Art, the National Museum of African Art, the National Archives, the Library of Congress, and other national and private institutions and repositories--to ensure compliance with accepted policies and practices.

Over the years, as exhibitions and other programs of the Museum became more ambitious, the reliance on objects loaned from other museums and private collections greatly increased the amount of this additional work for the research staff, with staff historians assuming curatorial and registrarial responsibilities for their projects. For instance, the recent exhibition on "The Renaissance" required the insured loans of some 250 objects; and the forthcoming "Climbing Jacob's Ladder" exhibition involves the loan of 177 artifacts, valued in excess of \$500,000, from 40 locations around the country. This compares to 63 objects borrowed for the "Out of Africa" exhibit (produced in 1978-79). Because of the increasing dollar value of each of these loans as well as the number of artifacts and memorabilia, the responsibility of the Museum to these lenders requires that these registrarial duties, including the documentation of the condition of objects when received, be conducted by a professional museum registrar (1 workyear and \$29,000).

The new registrar position would also help to reduce the amount of time required to complete each exhibit project, since the research staff would no longer have to split their time between research and registrarial duties. The position would also provide necessary staff support for exhibitions developed by guest scholars/curators. When the noted scholar in the field of Afro-American Art History, Dr. David C. Driskell, served as guest curator for "Contemporary Visual Expressions," it was necessary to contract for registrarial services.

As the research capabilities of the Museum have developed, the small reference library collection, which consists of approximately 1,500 volumes including serial runs and sets of encyclopedias, has expanded. Without the necessary organization or comprehensive planning to make it an effective research collection, it remains

virtually unusable in its current condition (in temporary storage in boxes). The requested increase would allow the Museum to hire a professional librarian (1 workyear and \$24,000). The librarian's duties would include organizing and cataloguing the current collection; purchasing and cataloguing new books; borrowing books through inter-library loan for use by Anacostia staff; updating files using both the SIBIS and OCLC computer terminals; maintaining a circulation desk for both the Museum staff and the public; upkeeping shelves and books; and answering all public inquiries relevant to the library collections.

A sum of \$17,000 is also requested to purchase books and other library material; purchase book cases and other specialized library equipment; and provide other program support for these two positions, including travel, printing and reproduction, and other services.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Funds are provided by an annual allotment to cover the salary costs of a woodcrafter. During FY 1988, this woodcrafter will complete the fabrication of cases for the "Climbing Jacob's Ladder" exhibition. He will also fabricate free standing partitions for hanging the art work for the D.C. Art Association show; fabricate working models for the "A Continuing Tradition: Afro-American Contributions to American Technology" show; and cut and produce frames for photographs and posters. Additional funds derived from donations and exhibition rentals are used to purchase supplies and materials to support the museum's programs.

Restricted Funds - These are in the form of gifts from organizations and individuals and are designated for the support of specific museum programs.

CONSERVATION ANALYTICAL LABORATORY

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	41	2,372	--	--	--	14	1	30	--	--
FY 1988 Estimate	41	2,418	--	--	--	20	1	50	--	--
FY 1989 Estimate	41	2,418	--	--	--	20	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Conservation Analytical Laboratory (CAL) is the Smithsonian's specialized research facility for all aspects of the conservation and technical study of museum objects. CAL advises and assists the Smithsonian and other museums in the study, preservation and conservation of objects of artistic, scientific, cultural and historical importance. Research is performed on the conservation related properties of materials, the improvement of conservation treatment technology, and the extraction of historical information from the technical record of the materials being studied. The knowledge gained from scientific research is applied directly to the actual treatment of objects, while the diversity and the wide variety in the state of preservation of these objects provides the overview needed to define directions in conservation research. Experience with a large range of materials and broad expertise in analytical and technological studies enable CAL to engage successfully in a wide spectrum of interactive and collaborative research with anthropologists and art historians.

CAL conducts a conservation training program which includes basic and advanced conservation training, supports and organizes workshops and seminars, and provides various opportunities for the dissemination of the latest knowledge in the field of conservation to museums and research professionals throughout the United States and the world. No increase is requested for FY 1989.

PROGRAM - CAL's activities are carried out in a number of interrelated programs: Archaeometry, Conservation Science, Conservation Treatment, Conservation Training, and Information. CAL's program of conservation treatment, supported by specialized scientific facilities and basic research in conservation science, is conducive to the success of its conservation training program.

Archaeometry - In the field of archaeometry, methods are developed for the chemical and physical analyses of museum objects and related materials, and the results of such analyses are integrated with the archeological, anthropological, art historical and cultural background data on the same materials. These analyses

provide data concerning materials, dates, provenances, attributions and historical technologies, which, in combination with contextual information and typological and stylistical analyses, serve to answer anthropological or art historical questions.

CAL's programs of trace element characterization of archaeological ceramics and clay sources again produced large quantities of chemical analytical data on materials from various geographical and chronological contexts. These projects were largely of an inter-institutional nature, involving collaborations with scholars from nationwide and international academic and research institutions. The project on archaeological Hopi ceramics involves collaboration with many academic institutions as well as representatives of the Hopi Nation. The analytical work for its first phase, which endeavors to examine the social interchanges and boundary maintenance during the period of the great migrations, was completed. It is hoped that a second phase will examine the influences of the contact with the Spanish in the New World, as reflected in changes of style and technology. Work on materials from Mezo America resulted in close ties with academic institutions in Costa Rica. The project on ceramics from the Middle East attracted several working visits from collaborating French scholars, while an Italian collaborator will spend a postdoctoral fellowship at CAL during the coming year. Work continued also on ceramics from Spain and North Africa, while an exploratory study was started on Indian ceramics. Technological studies of ceramic materials centered on Far Eastern porcelains and stonewares, prehistoric Middle European materials, and faience from Egyptian, Middle Eastern and Far Eastern province.

In the lead isotope analysis program, the work on Chinese bronzes from the Sackler Collection was completed. A start was made with exploratory work for a project on potential ore sources for early Near Eastern silver manufacture. Metallurgical studies were concluded on the technology of historic music wire and the iron technology in Britain during the early Iron Age and the Roman period. In collaboration with archaeologists at National Museum of Natural History, a study was made on the iron technology of early Iron Age materials excavated at Tell Jemmeh. Work continued on the chemical and mineralogical characterization of Mezo American jades, and on the chemical analyses of natural resins used in the manufacture of objects from South East Asia.

In the joint program with the National Bureau of Standards and the National Museum of American Art, on the autoradiographic studies of paintings by Thomas W. Dewing and Albert P. Ryder, special emphasis was placed on the study of the latter artist. This project, which also involves the utilization of a number of other techniques for the examination and analysis of these paintings, has already produced interesting results which provide new information on the process of the creation of these works.

The utility of the Smithsonian Archaeometric Research Collections Records (SARGAR) database was greatly enhanced through the loading of stylistical, typological and provenience data for the analyzed materials, which permits a direct linking of these data in the formation of statistical groupings.

Conservation Science - CAL's conservation science program pursues research into the characterization of the chemical and physical processes involved in the deterioration of materials encountered in museum collections, and the assessment of parameters, both external and internal, which affect the rates of these processes. In support of conservators and curators Institution-wide, chemical and physical analyses and technical examinations are performed on request for such assistance.

Preliminary preparation work was finished and research got fully under way in the important study of the chemical and physical effects of fumigation on proteinaceous materials in museum objects. This project involves collaborations with other conservation research institutions in the United States and Canada, and receives financial support from the Getty Conservation Institute.

For the research program on the conservation of photographic materials, authorized in FY 1986, a special advisory committee was formed with experts from industry and the museum community; recruitment of staff proceeded and is expected to be completed in the latter part of FY 1987, after which research in this area will get under way. The evaluative study of conditions for accelerated aging of paper produced extremely interesting results and will continue.

In the program of research on the influence of climatic and environmental factors, work proceeded in the study of the interaction of controlled climates in historic buildings and the fabric of these buildings. The installation of sensors in the new facade of the Renwick Gallery was completed, and the collection of data from this monitoring equipment began. With the recruitment of a materials research engineer in the latter part of FY 1987, research in the mechanical processes resulting from environmental factors, as well as other aging processes, can be pursued with greater sophistication.

Conservation scientists collaborated with conservators at CAL and Institution-wide on a number of joint research projects, and provided analytical and technical support to conservators and curators in a number of bureaus.

Conservation Treatment - CAL conservators pursued a variety of projects aimed at the development, improvement and testing of treatment technology. Subjects such as the wavelength dependency of efficiency and safety for light induced bleaching of discolored paper; a new method for surface cleaning of large marble statuary; the side effects of boiling archeological iron artifacts in water for chloride removal; the deterioration of weighted silks; the stability of certain pigment/binder systems for textiles; the effects on the binding of the fibers of solvents used in paper treatment; and the evaluation of consolidants for the treatment of archeological plaster, were researched, often in close collaboration with the conservation scientists.

Smithsonian museums primarily rely on their in-house conservation staff for the maintenance of their collections and the performance of treatment procedures. CAL did however assist the museums in cases where the complexity of the problem required special research and the use of specialized equipment, or when the necessary expertise is not available in house. Such assistance was provided in the form of condition surveys, consultations, and actual treatments on a wide variety of objects for many bureaus.

CAL continued the conservation support of the excavations at Harappa, Pakistan; a CAL objects conservator spent six weeks at this important site treating excavated objects and teaching staff at the local museum on the care of these objects.

Conservation Training - The activities in the conservation training program were expanded significantly with several new initiatives which were made possible through the Congressional allocation of additional funds for this purpose. These include the establishment of a number of post graduate conservation internships at

the various conservation laboratories in the Smithsonian, and a joint program, with the Johns Hopkins University, for the training of conservation scientists. Part of the newly allocated funds was also used for contracts with the existing academic training programs to ensure continuation of their activities.

The first class of CAL's own entry level training program for furniture conservators completed its first year successfully. This innovative new program is attracting wide attention in the profession. CAL again organized a number of special courses for practicing conservators, on subjects such as the metallurgy of archeological artifacts, the conservation of marquetry and boulle work, the conservation and restoration of faux finishes, and the production of replicas through electroforming. For collections managers and curators of small museums, a course on the effects and control of environmental conditions was organized, and an audiovisual tape was prepared on the same subject.

A number of interns were hosted again, at various levels of expertise and experience. Four summer internships in textile conservation, two in objects conservation and one in paper conservation were awarded to students in an early stage of their professional training. A paper conservation student spent a year at CAL in fulfillment of the requirements for graduation at an academic training program. The objects laboratory hosted two postgraduate interns, while two paintings conservators from Germany and Venezuela spent a postgraduate internship in CAL's paintings laboratory. CAL conservators frequently served as faculty in conservation workshops organized at the Smithsonian and elsewhere.

Information - The information program provides bibliographic and reference support to CAL's staff and conservators within and outside the Smithsonian, as well as public information on conservation questions from the general public. Together with six other major international organizations and institutions, CAL is a contributing member of the Conservation Information Network, a new major international database on conservation information. This collaborative network, made possible by financial support from the Getty Conservation Institute, which was made available to conservation professionals worldwide, enables CAL staff to access a far wider range of references than its own extensive reference collections would afford.

CAL's unique, extensive collection of reprints from the conservation and related literature, was enhanced through the addition of many new entries, and the improvement of indexed access to the information. Activities continued in the public information program, where questions from the general public on conservation matters are answered by the appropriate expert, and information is provided to museum professionals from all over the United States.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Funds are available from the Institution's Scholarly Studies Program, Research Opportunities Fund and Short Term Visitors program to support research projects.

Restricted Funds - Funds are provided in the form of gifts and grants from individuals, organizations or corporations for specific purposes. A grant from the Santa Fe Pacific Foundation supported a visiting scholar working on the study of Hopi ceramics. The Getty Conservation Institute provides funds in support of a multiyear study on the effects of fumigants on materials in museum collections.

OFFICE OF EXHIBITS CENTRAL

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	44	1,753	--	--	--	32	--	--	--	--
FY 1988 Estimate	46	1,841	--	--	--	-7	--	--	--	--
FY 1989 Estimate	46	1,841	--	--	--	-13	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Exhibits Central (OEC) is essential to the successful mounting of a great many of the exhibitions presented at the Smithsonian. The highly skilled exhibition specialists and the well-equipped facilities of OEC provide those Smithsonian units having little or no specialized exhibition capability with invaluable and substantial support in the staging of exhibition and exhibit-related programs. The vast majority of the projects assumed by OEC are unique and involve the exhibition of specific objects from the collections of the Institution, other museums, and private collections. The value of these objects requires that OEC maintain the highest standards in its work. For this reason, meticulous attention to accuracy and extreme care in the handling of museum objects have always characterized the work performed by OEC. No program increase is requested for FY 1989.

PROGRAM - The Office of Exhibits Central provides professional services in all phases of exhibition production. In FY 1987, OEC designed and produced almost 20 exhibitions for the Smithsonian Institution Traveling Exhibition Service (SITES). "Russia: The Land, The People" consisted of 65 Russian paintings from Moscow and Leningrad, which had to be reframed and protected with Lexan, a protective covering. This was done under the supervision of a Russian conservator. OEC also produced the introductory panel and labels, installed the exhibit in the Renwick Gallery, and upgraded the Russian-built crates for travel in the United States.

In addition to preparing several hundred customized shipping containers for various exhibitions, the OEC Fabrication Unit built 72 crates for "Magnificent Voyagers." Of a total of 72 crates, five were particularly unique (even by OEC standards), designed to safely travel the model ships. The Model Shop also remade the Fiji club dancer mannequin to ensure its safe travel. OEC packed and crated well over 400 objects in the exhibition for travel.

The OEC Graphics Unit contributed to the success of the 21st Festival of American Folklife by mounting almost 320 photographs and silk-screening information on over 200 panel surfaces.

OEC provided support to the Smithsonian Associates by designing, writing, editing and supervising the printing of more than 50 brochures for its travel programs. Similar support was provided to the Women's Committee of the Smithsonian Associates for their Craft Show and Christmas Dance.

OEC staff continues to serve as faculty in the "Workshops for Museum Professionals," organized by the Office of Museum Programs, and as consultants on Institution-wide planning for exhibitions, graphics, and the design and use of public spaces on the Mall and in Smithsonian museums.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are provided by tuition fees received from local universities, proceeds from the sale of the OEC book A Freeze-Dry Manual through the Smithsonian Institution Press and reimbursements from internal Smithsonian units. These funds are used to purchase supplies, materials and services in support of OEC activities, to defray costs associated with special events and, as needed, to supplement a portion of travel expenses associated with consultation with other museum professionals.

SMITHSONIAN INSTITUTION TRAVELING EXHIBITION SERVICE

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	15	569	7	250	24	1,643	3	514	--	132
FY 1988 Estimate	17	743	8	300	23	1,809	1	1,583	--	19
FY 1989 Estimate	18	773	8	314	23	1,953	--	920	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Smithsonian Institution Traveling Exhibition Service (SITES) provides an important national service by offering carefully selected, well designed, and widely circulated traveling exhibitions. The exhibitions draw upon the collections of the Smithsonian, United States and foreign museums, foreign governments, private individuals, and organizations throughout the world. During FY 1987, SITES relocated to the Quadrangle. For FY 1989, an increase of 1 workyear and \$30,000 is requested to continue research on Latin American exhibition themes for the Quincentenary celebration of the Columbus expedition.

PROGRAM - The Smithsonian Institution Traveling Exhibition Service is the primary organizer of Smithsonian traveling exhibitions. SITES, which is the largest service of its kind in the United States, provides a broad selection of exhibitions encompassing the diverse disciplines and subject matter represented in the collections of the Smithsonian. These disciplines include the arts, natural history, design, archeology, anthropology, science and technology, decorative arts and crafts, and popular culture. SITES' exhibitions are accompanied by curatorial and registrarial information, handling instructions, technical information, publicity materials, suggested educational activities and public programs, and in most instances, publications. SITES also provides professional assistance on a variety of topics, including the shipping and insuring of artifacts; installation techniques; exhibition security; design and upgrading of exhibition space; and contract matters.

SITES represents an important Smithsonian outreach and service program. At any time, over 120 exhibitions are in circulation or planning and production stages. These exhibitions are seen by approximately five million people each year at museums, galleries, and educational and cultural institutions around the world. Since its establishment in 1952, SITES exhibitions have reached an estimated audience of over 110 million people in 15,000 communities. The national audience learns of SITES exhibitions in local communities through the Smithsonian Magazine and other cooperative publicity efforts of the Institution. Update, SITES annual

catalogue of available exhibitions, and its quarterly newsletter Siteline, are received annually by over 9,000 institutions and individuals in cultural organizations around the world.

Thousands of organizations depend on SITES exhibitions to meet their programming needs. For a fraction of their own developmental costs, exhibitors are able to bring the Smithsonian's cultural programs to their own communities. SITES' total operating budget can be divided into two general categories: direct subsidies and recoverable costs. Non-reimbursable support consists of three funding sources: a Federal appropriation; a limited amount of nonappropriated Trust fund support from the Institution; and outside grants and contracts. All remaining operating costs must be recovered by SITES through participation (rental) fees charged to exhibitors. This proportion is expected to increase in SITES' total FY 1988 budget. To the extent that Federal appropriations decrease the total expenses that must be recovered through participation fees, Federal assistance enables SITES to keep participation fees low and affordable to cultural institutions nationwide.

During FY 1987, 387 SITES exhibitions traveled in the United States to 227 cities in 45 states and the District of Columbia as represented below:

Alabama	9	Montana	0
Alaska	4	Nebraska	3
Arizona	2	Nevada	5
Arkansas	3	New Hampshire	2
California	24	New Jersey	4
Colorado	14	New Mexico	13
Connecticut	3	New York	19
Delaware	0	North Carolina	10
District of Columbia	8	North Dakota	0
Florida	22	Ohio	17
Georgia	11	Oklahoma	6
Hawaii	2	Oregon	5
Idaho	1	Pennsylvania	21
Illinois	12	Rhode Island	2
Indiana	10	South Carolina	3
Iowa	8	South Dakota	0
Kansas	6	Tennessee	13
Kentucky	7	Texas	25
Louisiana	7	Utah	2
Maine	5	Vermont	0
Maryland	9	Virginia	4
Massachusetts	15	Washington	6
Michigan	16	West Virginia	4
Minnesota	5	Wisconsin	8
Mississippi	5	Wyoming	2
Missouri	5		

SITES also runs an active international program, sharing collections from the Smithsonian and other sources and exhibition expertise with millions of people in other countries. In FY 1987, nine SITES exhibitions traveled abroad. To date in FY 1987, "People of the Forest: Photographs of the Maya by Gertrude Blom" traveled to The Netherlands; and "Kings, Heroes, and Lovers" was on view in Puerto Rico. Canadian institutions hosted several exhibitions, including "Master Weavers"; "Know

What You See: The Examination and Treatment of Paintings"; "Genre Scenes"; "America's Space Truck: The Space Shuttle"; "Unfamiliar Fauna of the Open Sea"; and "Gauguin and His Circle in Brittany."

A major goal of SITES is to share the resources of the Smithsonian at reasonable fees. Smaller museums and organizations look to SITES for light-weight, easily installed, low-cost exhibitions. SITES perfected this type of show during the 1970s. Another specialized exhibition format SITES developed is the poster panel exhibition. The four currently available may be purchased directly and range in themes from black history to science. In FY 1987, SITES released the poster panel show "Diversity Endangered" treating the global problems of vanishing species and habitats. For the first time, SITES is offering cardboard kiosk mounts for this show as well as an educational videotape.

SITES estimates that 52 new exhibitions will begin their tours during FY 1988 and FY 1989. Among the major new exhibitions for FY 1988 are: "A Russian Impressionist: Paintings and Drawings by Leonid Pasternak, 1880-1940"; "King Herod's Dream: Caesarea on the Sea"; "Master Watercolors and Drawings from the Norton Gallery of Art"; "New Horizons: American Painting 1840-1910"; "Views of Rome: Watercolors and Drawings from the Collection of the Biblioteca Apostolica Vaticana"; and "Voices of Hellenism: The Collection of Anthony Benaki." The number of new exhibitions each year fluctuates between 25 and 30. Each exhibition, whether from internal or external sources, requires approximately two years to develop and fabricate. In September 1987, "Generations," a major exhibition organized jointly by SITES and the International Center, will open as the inaugural exhibition in the Smithsonian's new International Gallery. The following May, "Tropical Rainforests: A Disappearing Treasure" will be the second SITES exhibition to be installed in the International Gallery.

Major Organizational Changes and Developments

FY 1987 began with a move to the new Quadrangle facility. Over the course of this fiscal year, SITES hired an Education Workshop Coordinator to operate the new workshop for museum colleagues. Other achievements included: planning for the proper outfitting and installation of exhibitions in a small Introductory Gallery; working closely with the International Center to produce "Generations"; and broadening the international reach of the exhibition program through projects such as exhibitions celebrating the Quincentenary.

SITES' top two long-range priorities are to develop more Smithsonian-derived exhibitions and to increase the number of international exhibitions in the SITES program. These priorities will be implemented through greater efforts to incorporate Smithsonian curatorial expertise in program development to solidify working relationships with foreign colleagues. Successes to date in this area of international collaboration include "Russia, The Land, The People: Russian Painting 1850-1910," and "Ebla to Damascus: Art and Archeology of Ancient Syria."

EXPLANATION OF PROGRAM INCREASE - A program increase of 1 workyear and \$30,000 is requested to continue research on Latin American exhibition themes for the Quincentenary celebration of the Columbus expedition.

In FY 1987, funds appropriated for the Quincentenary were used for exhibition research and development. The requested increase in FY 1989 for an Exhibition Coordinator (1 workyear and \$30,000) will enable interaction with Smithsonian

curators, bureaus, and other offices involved in developing and producing exhibitions on themes of cross-cultural influences which the Americas have had on European cultures. Exhibition themes currently under investigation include the architecture of Luis Barragan, the cultures of the Isthmus, DeSoto in Florida, and the People of Taos Pueblo. The Exhibition Coordinator will also work with Latin American museums to provide them with technical advice.

Dedicated support of Smithsonian research and collections, through exhibitions, is central to SITES' mission and directly addresses the Secretary's area of emphasis for collections-based research. This priority also addresses the public service emphasis addressed by the Secretary by making Smithsonian educational opportunities more widely available. Finally, this priority for Quincentenary exhibition funding meets the Institution's international program goals, not only through the subject matter of the exhibitions but also through providing Latin American museums with Smithsonian exhibitions.

Should this increase not be granted, SITES will be prevented from allocating scarce staff time and resources toward any Quincentenary effort, which would negatively affect priorities of increasing the international breadth and quality of the program.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are derived from participation fees collected from museums, universities, historical societies, and other recipients of traveling exhibitions. These funds, supplemented by an allotment, support virtually all exhibition development costs including publications, materials, outside specialists, and contractual services.

Restricted Funds - Funds are provided in the form of gifts and foundation grants from individuals, organizations, and corporations for specific purposes. During FY 1987, several grants were received: for "Russia, The Land, The People: Russian Painting 1840-1910" from PepsiCo International, Inc. and Armand Hammer Foundation; for "New Horizons: American Painting 1840-1910," from PepsiCo International, Inc.; from American Express for "Diamonds Are Forever: Artists and Writers on Baseball"; and from the MacArthur Foundation and the Gund Foundation for "Tropical Rainforests: A Disappearing Treasure."

During FY 1988 and FY 1989, major funding is expected for the following exhibitions: "Frank Lloyd Wright" (from Domino Pizza Corporation); "Irish Decorative Arts from the National Gallery of Ireland"; "The Jewelry of Morocco"; "Pioneering the Space Frontier"; "Splendor and Seclusion"; "Turkish Rugs"; "Views of Rome: Watercolors and Drawings from the Collection of the Biblioteca Apostolica Vaticana"; and "The Voices of Hellenism: The Collection of Anthony Benaki."

Funds are available from the Institution's Educational Outreach Program and Special Exhibition Fund to support research, education, and exhibition projects.

ASSISTANT SECRETARY FOR PUBLIC SERVICE

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	24	1,292	40	2,388	--	151	--	-16	--	--
FY 1988 Estimate	24	1,305	42	2,540	--	77	--	--	--	--
FY 1989 Estimate	24	1,305	43	2,713	--	83	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of the Assistant Secretary for Public Service encourages and supports the development of programs to advance the Institution's objectives in education, publication, information, electronic media, folklife programs and the development of wider audiences. It advises the Secretary on general policy issues and program planning for Public Service activities. Included in this line item are the Office of the Committee for A Wider Audience, the Office of Telecommunications, the Visitor Information and Associates' Reception Center, and the Office of Public Affairs. No program increase is requested for FY 1989.

PROGRAM - I. The Office of the Assistant Secretary for Public Service: The Office of the Assistant Secretary for Public Service coordinates and supervises the Institution's educational and public service programs and advises the Secretary on the development of policies and activities for these programs. The bureaus and offices reporting to the Assistant Secretary include the Office of Telecommunications; the Visitor Information and Associates' Reception Center; the Office of Public Affairs; the Smithsonian Institution Press; Smithsonian Magazine and Air and Space Magazine; the Office of Folklife Programs; the Office of Interdisciplinary Studies; the Office of Elementary and Secondary Education; the Committee for A Wider Audience; and the National Sciences Resources Center.

II. Office of Telecommunications: The Office of Telecommunications (OTC) produces radio, film, and television programs on the Smithsonian's varied scholarly activities. These wide-ranging programs, broadcast nationally, inform the public and support the research, exhibitions and educational goals of the Institution. Available to educational institutions and libraries, these programs have garnered enthusiastic response from audiences and recognition and honors from the broadcast and film industries.

The Office produces two major program series. "Here at the Smithsonian...", an award-winning series of video features, launched its sixth season with 180

audience in the United States according to the National Academy of Television Arts and Sciences. "Radio Smithsonian," a weekly 30-minute series, continues as the oldest of the Institution's various broadcast efforts. Now in its 18th year, it has become a staple for many member stations of National Public Radio with a potential weekly listening audience of four million people. Programs focus on exhibitions, research and performance activities throughout the Institution.

In FY 1987, the Office completed 13 film and video projects. Examples include: "From Reliable Sources," a film produced at the request of the Archives of American Art, depicting the Archives' activities and its role in documenting the history of American art. "Disabled Museum Visitors: Part of Your General Public," a training tape for docents, was produced in cooperation with the Office of Elementary and Secondary Education. Captioned for the hearing impaired, it addresses the specific needs of visitors with various disabilities and accompanies a comprehensive training manual. It will be distributed to over 500 museums and historic sites across the Nation. "Diversity Endangered" is a videotape produced to accompany a Smithsonian Institution Traveling Exhibition Service poster-panel exhibition for sale to schools, libraries and museums nationwide to help raise awareness about biological diversity and how it is threatened by human activities. "Field to Factory," a tape produced for showing in the National Museum of American History exhibition, tells the story of the black migration from the rural south to the urban north between 1915 and 1940. Finally, "Engines of Change" is a video epilogue for this major National Museum of American History exhibition which explores America's metamorphosis from an agricultural nation to an industrial power.

Projects that are currently in production cover an equally wide spectrum. "Magnificent Voyagers," a film on the 1838-1842 U.S. Exploring Expedition (the Wilkes Expedition), was requested by the National Museum of Natural History's Office of Education. It is designed for wide circulation to the educational market, with completion expected in 1987. Another film nearing completion will document efforts to construct a prototype leading to the building of a model of the earth's biosphere, ultimately intended for use in the 21st century for space colonization. This film was requested by the Marine Systems Laboratory. In yet another direction, a multi-segment interactive video disc is in production which will be a major component for the future National Museum of American History exhibition, "A Material World." OTC is working with the Museum's Department of Science and Technology on this project. At the National Zoological Park's request, a 10-15 minute videotape on the 15-year research effort to raise Brazilian Golden Lion Tamarin monkeys for reintroduction to their natural habitat is now in production. A 15-20 minute videotape is in production for the Visitor Information and Associates' Reception Center for the new Orientation Center in the Castle. Designed to introduce the first-time visitor to the entire complex of Smithsonian museums in Washington, D.C., it will provide information on the origins of the Institution, the building locations and highlights of the collections. The National Museum of American History's Division of Medical Sciences has received tentative approval to produce a half-hour film on the 100-year history of the Visiting Nurses Associations of America for which funding will be forthcoming. OTC could begin work on this project during the latter part of 1987.

Research and pre-production planning have been initiated on several significant projects: a new Smithsonian radio series would prominently feature performances of music from around the world; another radio series, this one for children aged 9-12 years, would combine education and entertainment -- facts and

fantasy -- in a mix designed to appeal to the younger museum-goer. In addition, the Office plans to encourage and help develop new interactive programming for other media projects growing out of exhibition and education programs of Smithsonian bureaus. The development of program ideas for video and film productions with appeal for minority audiences is being actively pursued. Initial emphasis will be placed on subjects that would interest the Hispanic community.

III. Visitor Information and Associates' Reception Center: The Visitor Information and Associates' Reception Center (VIARC) provides the public with information on Smithsonian exhibitions, events, programs and activities, and administers a range of centralized information and assistance programs which serve the public, Associate members, Smithsonian staff, volunteers, and interns.

VIARC's daily services include the staffing of 16 information desks in 11 museums by a corps of some 500 volunteers and the operation of the Institution's primary telephone information service, which also provides 24-hour recorded information on Dial-A-Museum and Dial-A-Phenomenon. VIARC also serves as the primary research, response, and referral point for public inquiry mail; operates an outreach program to promote previsit education; presents a variety of daily slide/lecture orientation programs for visitors; and conducts behind-the-scenes tours of the Castle Building. During the summer months when visitation is at a peak, VIARC supplements the information services available in the museums with mobile information units on the Mall. In addition, VIARC conducts a registration and placement program for the approximately 1,200 volunteers who assist behind the scenes pan-Institutionally, and a similar registration and placement program for interns.

To strengthen the Institution's ability to better inform, orient, and serve its millions of visitors, VIARC has developed a multifaceted program to upgrade services provided by the Institution. Some significant components of this project are the development of a uniform system of identification for Smithsonian facilities; and pedestrian and vehicular directional signs; production of general information directories; and the establishment of the Smithsonian Information Center in the Castle Building, which will provide a primary point of information and orientation.

IV. Office of Public Affairs: The Office of Public Affairs (OPA) is responsible for acquainting the public with the programs and policies of the Institution. This is achieved with news releases, the Smithsonian News Service, feature articles, Research Reports, calendars, radio and television public service announcements, guides, brochures, contacts with journalists, news conferences, and paid advertisements. OPA provides advice to the individual bureaus and offices on public information policies and programs; OPA also monitors the units' public information materials, the Institution's many relations with corporate and other sponsors, and the advertising and promotional plans and materials of corporate sponsors. OPA produces a monthly staff newspaper, The Torch, and informs management of public and media attitudes and needs. The OPA director serves as the principal Institutional spokesperson.

For the past eight years, the Smithsonian News Service has provided some 2,000 daily and weekly newspapers with a free, monthly package of four feature-style articles on subjects in art, history, science, technology, and contemporary life. In September 1986, the News Service launched a Spanish-language edition, which is distributed to approximately 100 Hispanic and bilingual newspapers in the United

States (including Puerto Rico) and Canada. The Hispanic edition, which provides one article per month in Spanish, has been greeted with enthusiastic reviews, and OPA plans to expand distribution into Latin America in FY 1988. OPA also began the electronic distribution of News Service articles to client newspapers at cost through the Associated Press DataFeature wire.

In 1987, OPA continued and expanded its plan for reaching a broad range of ethnic communities, including blacks, Hispanics, Asian-Americans and Native Americans. The plan involves preparation and distribution of news releases, brochures, public service announcements for radio and television and direct media contact. In FY 1987, OPA completed a brochure for the Anacostia Museum, dioramas for the Metro rail system on the theme "Explore Your Heritage," and a TV public service announcement along the same theme--all aimed primarily at the black community. Outreach aimed at the Hispanic community involved the preparation of news releases in Spanish on the Festival of American Folklife and other relevant Smithsonian programs, a briefing for Hispanic media on the Columbus Quincentenary, translation and distribution of the Monthly Calendar of Events in Spanish and the preparation of the Institution's visitor slide show in Spanish. Further activities are planned in FY 1988, including additional paid advertisements in black and Hispanic media and public service announcements for television.

OPA continued to focus on the communication of research activities to the media through direct contact with journalists, resulting in many major articles appearing in such national publications as the New York Times and the Washington Post. The circulation of Research Reports, a periodical devoted to reports on research in the arts, history, and science reached a record in FY 1987 of nearly 46,000 readers including the scholarly community, foundations, universities, and Smithsonian contributing members.

In FY 1987, OPA conducted and coordinated an extensive media campaign associated with the May 22 opening of the Enid A. Haupt Garden and the Smithsonian's new museum, research, and education complex on the Quadrangle. This included the production of revised editions of the Smithsonian's main visitor brochure, Welcome (including six foreign languages), "Explore Your Heritage," "Guide for Disabled Visitors," "Yesterday and Today" (a guide for journalists), and a commemorative VIP brochure; special press kits; paid advertisements in national media; radio and television public service announcements; advertising on Metro fare cards; and an exhibition at the Martin Luther King Library in Washington, D.C.

The Office continues to receive acclaim for the work of its staff from the National Association of Government Communicators, the Society for Technical Communications, and the American Association of Museums.

NONAPPROPRIATED SOURCES OF FUNDING:

I. Unrestricted General and Special Purpose Funds - The Office of the Assistant Secretary for Public Service: These funds are provided by allotments that cover: the salary and benefits of staff members assigned to the immediate office of the Assistant Secretary for Public Service, electronic media activities, and costs for the Office of the Committee for A Wider Audience (including the Cultural Education Committee), which fosters the development of pan-Institutional outreach efforts designed to attract diverse cultural audiences.

II. Office of Telecommunications: These funds are provided by allotments which support the production of educational and informational materials for television, film and radio. In addition, a nominal amount of subscription fees is received to help defray some of the production and distribution costs. Additional funds are obtained through sales of films and video-tape programs. The Office produces two ongoing series of programs which reach the American public regularly through radio and television. "Here at the Smithsonian...", a series of television features, and "Radio Smithsonian," a weekly half-hour magazine program, are financed partly by an allotment and partly by subscriber fees.

III. Visitors Information and Associates' Reception Center: These funds are provided by an allotment and are used primarily to support staff members associated with the Center's work as the Institution's public service bureau responsible for the information and assistance activities described in the above program statement.

IV. Office of Public Affairs: These funds are provided by allotments which support public outreach activities such as publication of the Institution's Welcome brochure, Washington Post calendar advertisements, wider audience advertising with the black and Hispanic media, and public service announcements for radio and television.

SMITHSONIAN INSTITUTION PRESS

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	29	1,166	37	12,185	--	200	--	--	--	--
FY 1988 Estimate	29	1,197	37	13,195	--	--	--	--	--	--
FY 1989 Estimate	29	1,197	37	15,055	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - A member of the Association of American University Presses since 1966, the Smithsonian Institution Press is responsible for the editing, design, production, and distribution of books, sound recordings and other printed materials prepared by staff scientists, historians, curators, as well as scholars from educational institutions around the world. Such materials also include research monographs, technical and scientific series, exhibition catalogs for Smithsonian museums, educational pamphlets, and informational leaflets. For FY 1989, no program increase is requested.

PROGRAM - The Federal publication activity of the Press is a fundamental extension of the Smithsonian's basic research activities. The scientific, technological, and historical monographs published by the Press make the results of research by Smithsonian curators and staff experts available to libraries, museums, scientific institutions, and interested members of the public throughout the United States and abroad. Increasingly over the last several years, the process of assembling the data and writing the monographs has been computerized. During FY 1986 the Press added microcomputer-based "desktop publishing" techniques that use electronic manuscripts and eliminate expensive typesetting. In addition to publishing research findings, the Press edits and designs exhibition catalogues, educational pamphlets, and informational leaflets that serve the millions of visitors to the Smithsonian in Washington, D.C., and the extensive programs conducted all over the nation and around the world.

Additionally, the Press acts as the official agent of the Smithsonian Institution in procuring services from the U.S. Government Printing Office to create government forms, museum guides, and instructions, as well as in providing professional assistance to Smithsonian authors upon request. The Press also edits, designs, and produces Smithsonian Year, the Institution's annual report to the Regents and the Congress.

Federally funded books published during FY 1986 include "Geochronology of Sandia Cave," by C. Vance Hayes, Jr., and George A. Agogino (Smithsonian Contributions to Anthropology, #32); "A Phylogenetic Analysis of the Orchidaceae," by Pamela Burns-Balogh and V.A. Funk (Smithsonian Contributions to Botany, #61); "Stratigraphic Record of the Neogene Globorotalid Radiation (Planktonic Foraminiferida)," by Richard Cifelli and George Scott (Smithsonian Contributions to Paleobiology, #58); "Seasonal Variation in Use of Time and Space by the Wedge-capped Capuchin Monkey Cebus olivaceus: Implications for Foraging Theory," by John G. Robinson (Smithsonian Contributions to Zoology, #431); and "The Organs of Mexico City Cathedral," by D.A. Flentrop, translated by John Fesperman (Smithsonian Studies in History and Technology, #47).

Federally funded books published during FY 1987 include "The Allende Meteorite Reference Sample," by Eugene Jarosewich et al. (Smithsonian Contributions to the Earth Sciences, #26); "A History, Bibliography, and Annotated Account of the Benthic Marine Algae of Taiwan," by Jane E. Lewis and James N. Norris (Smithsonian Contributions to the Marine Sciences, #29); "Biology of Freshwater Fishes of the Bermuda Ocean Acre," by Robert H. Gibbs, Jr., and William H. Krueger (Smithsonian Contributions to Zoology, #452); "The Korean Onggi Potter," by Robert Sayers with Ralph Rinzler (Smithsonian Folklife Studies, #5); and "A Brief History of Geomagnetism and a Catalog of the Collections of the National Museum of American History," by Robert F. Multhauf and Gregory Good (Smithsonian Studies in History and Technology, #348).

In 1986, the Smithsonian book program continued to publish books acclaimed by critics. The Evolution and Ecology of Armadillos, Sloths, and Vermilinguas, a collection of 40 symposium papers, makes valuable contributions of concentrated knowledge to students of Neotropical mammalogy. Rethinking Regionalism: John Steuart Curry and the Kansas Mural Controversy, by M. Sue Kendall, is the second volume in the New Directions in American Art series. This book has been noted for its excellent scholarship and writing, as well as its insights into Kansas' culture, history, people, and the artist who portrayed them. The Handbook of North American Indians: v. 11: Great Basin, whose 45 chapters were written by leading experts, is a true handbook for all scholars of American Indian life.

Other scholarly publications well received by critics were David H. DeVorkin's Practical Astronomy: Lectures on Time, Place, and Space; Plains Indian Sculpture by John C. Ewers, who based this book on 20 years of research and visits to more than 150 museums; and Animal Intelligence, edited by R. J. Hoage and Larry Goldman, which is a companion volume to Animal Extinctions published in 1985. And From Concept to Context: Approaches to Asian Art and Calligraphy, designed by Carol Beehler, was selected for the American Association of University Presses' annual book show. It was one of 50 books selected from more than 400 entries.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are derived from the sale of Trust-funded books, recordings, royalties, and special publishing services. These funds support the necessary services required to develop, market, warehouse, and distribute records and scholarly and general interest books, which are published in connection with the Institution's research collections, exhibitions, and other programs.

In 1987, the University Press division added Focke Wulf Fw 190 as the latest addition to the Famous Aircraft of the National Air and Space Museum Series that now includes nine titles. The new Smithsonian Series in Archaeological Inquiry was introduced by a major study on The Archaeology of Western Iran. Ongoing is the series in Ethnographic Inquiry to which were added two volumes, Independents Declared: The Dilemma of Independent Trucking and Pintupi Country, Pintupi Self. Celebrating the architectural story behind the Quadrangle development is A New View from the Castle by Smithsonian Magazine writer Edwards Park.

The Smithsonian Collection of Recordings publishes both popular recordings suitable for direct mail marketing to Smithsonian Associates and recordings of scholarly interest. During FY 1987, the recordings program released the revised edition of its critically acclaimed seven-disc Smithsonian Collection of Classic Jazz, updating the notes, upgrading the sound quality, and adding a seventh disc. The six-disc Singers and Soloists of the Swing Bands will be available for distribution in August 1987. Also released was the two-disc Jimmie Rodgers: America's Blue Yodeler programmed and annotated by Jimmie Rodgers expert Nolan Porterfield. The recordings program copublished with Cambridge Records The Mt. Calvary Church Organ recorded by John Fesperman, and with Nonesuch Records copublished Stephen Albert's Into Eclipse. This year as in 1985 and 1986, a Smithsonian Collection release, Virtuosi, was nominated for a National Academy of Recording Arts and Sciences (NARAS) "Grammy" award in the category of Best Album Notes and also received the American Society of Composers, Authors and Publishers (ASCAP) Deems Taylor Award for the notes.

Smithsonian Books, the popular book division of the Press, publishes books for a general audience on subjects that relate to Smithsonian collections and research interests. They are marketed primarily by direct mail to Smithsonian Associates and other mailing lists, and are also sold to the general public through several trade publishers. Some of the titles currently available are Flight, Smithsonian Book of North American Indians, Treasures of the Smithsonian, and Natural History. The goal of the program is to continue publishing books of general interest to the Associates that are well written, carefully researched, commercially successful, and critically well received.

DIRECTORATE OF INTERNATIONAL ACTIVITIES

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	12	634	11	805	--	150	--	44	--	--
FY 1988 Estimate	12	884	10	654	--	150	--	160	--	--
FY 1989 Estimate	12	884	10	649	--	150	--	161	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Directorate of International Activities serves to monitor, coordinate, and enhance the Smithsonian-wide endeavors in the international field. The work of the Directorate is conducted in three divisions: a program staff primarily responsible for planning the programs of the International Center, and for providing necessary liaison and coordination for certain institutional activities; an Office of Service and Protocol; and an Office of Publications Exchange. The Directorate also has responsibility for overall Smithsonian planning of the 1992 commemoration of the 500th anniversary of the landing of Columbus in the Americas, and administration of the Special Foreign Currency Program. During the latter part of FY 1987, an internal review of the Directorate was undertaken. The results of this review are currently being studied, and will likely lead to a rearticulation of these activities among other Smithsonian units, as a means of reinforcing the overall focus of Smithsonian international activities. No program increase is requested for FY 1989.

PROGRAM - International programs have played an important role within the Smithsonian from its earliest days when Joseph Henry established his global network of correspondents, and have increased over time. The Institution's international activities occur at many levels, from informal scholar-to-scholar correspondence, to highly structured institutional undertakings. The current staff associated with the Directorate assist in the facilitation of these undertakings.

International Center Programs - The wide range of continuing Smithsonian international interests form the core subject matter for programs of the International Center in the Quadrangle complex. The International Center provides a venue for discourse and exhibition on a wide array of international topics. A major objective of the Center is to put scholarly inquiry at the service of the general public's desire to understand a changing international scene, and in so doing, to focus not merely on contemporary concerns but place them in historical context. Programs in the International Center will include exhibitions, conferences,

colloquia, performances, film showings, lecture-discussion meetings, seminars, symposia and intensive workshops.

The exhibition inaugurating the International Center Gallery in FY 1987 is "Generations," a multidisciplinary, multicultural investigation of the art and rituals associated with birth from ancient times to the present. It links many diverse Smithsonian scholarly resources and collections to explore the richness and diversity of cultures worldwide as they celebrate this milestone of the human experience. Of particular importance in the exhibition is the interpretation of non-Western materials in context, through concentration on the ways certain cultures view this subject, how they incorporate it in their world view, how they deal with its reality as well as its symbolism, and how they express these ideas and concepts in material form.

A series of related public forums in FY 1988 entitled "Face to Face with the Next Generation" will allow for the further examination of issues that have a direct bearing on the future education, health, and social well-being of children throughout the world. Each month, leading experts from around the world will be convened to share with each other and with public audiences their insights and concerns about how critical problems and issues of today likely will affect new generations tomorrow. Other activities planned to complement the "Generations" exhibition include special programs for families throughout the year.

The second major exhibition in the International Center Gallery, "Tropical Rainforests: A Disappearing Treasure," organized by the Smithsonian Institution Traveling Exhibition Service, will open in May of 1988. This show again allows the Smithsonian to present the results of scientific research, much of which has been undertaken by its own staff, on the destruction of the world's tropical forests, the Earth's most biologically diverse habitat. The exhibition will address this timely and vital problem with a cross-disciplinary approach and will draw extensively upon the research conducted at the Institution's Tropical Research Institute, the Museum of Natural History and the National Zoo as well as other international research centers. The goals of this exhibition are to alert the public to the problems confronting tropical ecosystems, especially forests, and to present continuing programs in research, conservation and sustainable use.

To derive the maximum public educational potential of the exhibition, it is planned to sponsor a parallel series of scholarly and public programs. The programs are an integral part of the tropical forest exhibition because they will provide more in-depth information on a variety of topics that are too complex for, or otherwise not easily translatable into, a museum exhibition. The programs will assume three different formats -- film series, public lecture series, and scientific symposia and seminars -- and will be designed to appeal to a wide audience. This programming, developed for use at the Smithsonian, will also serve as a template for programming for the traveling exhibition version, scheduled to be presented in 12 other museums.

In 1986 the Directorate, in cooperation with the National Museum of Natural History and the Man and the Biosphere-UNESCO Program, undertook development of a new international program on biological diversity inventory procedures. The program was designed to develop a high resolution data base management system that will provide, in time, nearly complete biological inventories of selected species-rich sites such as Biosphere Reserves, National Parks and Reserves, and other protected areas of developing countries. (A Biosphere Reserve is an area selected

for protection and study because it is a representative example of one of the world's major ecosystems.) With such a methodology, comparative work can proceed more efficiently and accelerate the pace of understanding the scope and scale of biological diversity in the world.

One of the most important aspects of this new program is the training of biologists and other related professionals from developing countries, so that they can conduct their own biological inventories and assist in cataloguing bioresources within their respective countries. As a first step, with support from the United States Agency for International Development, the World Heritage Program of UNESCO and the Man and the Biosphere - UNESCO Program, field training workshops will be conducted in the fall of 1987 in Biosphere Reserves in Bolivia and Peru. Negotiations are presently under way with other national and international organizations to expand the program to other Latin American countries and abroad. Cooperation within the Institution has been initiated with the Biological Diversity in Latin American Program (BIOLAT), a new research initiative of the National Museum of Natural History.

Support Services for Smithsonian International Programs - The Office of Service and Protocol provides the basic services necessary to coordinate the international aspects of Smithsonian research and museum programs, such as obtaining passports and visas for Smithsonian travelers; facilitating communications and logistical arrangements for research and participation in meetings abroad; assisting in the drafting and implementing of agreements relating to international cooperative programs; providing assistance to foreign dignitaries and scholars who participate in Smithsonian programs in the United States; and compiling and updating the "Summary Profile of Smithsonian International Activities."

The Office of Publications Exchange fosters international scholarly interchange by enabling universities and learned societies in the United States to exchange their publications with those of corresponding institutions and governments of other countries. In recent years, more than 200 American universities, libraries and other organizations have participated in this international publications exchange. During FY 1987, it is expected that more than 90,000 volumes will be exchanged.

Special International Programs - During the next five years, the attention of the Smithsonian and, indeed, the Nation will become increasingly focused on the commemoration of the 500th anniversary of Christopher Columbus' 1492 voyage to the Americas. For the Smithsonian Institution, this occasion offers an opportunity to take a closer look at the past, present and future implications of this anniversary. The Institution has promoted the development of a centrally coordinated, pan-institutional Quincentenary program that will reflect the diversity of Smithsonian research interests and provide the general public with the broadest understanding of the significance of the Columbian voyage. In the fall of 1987, the Institution will sponsor a public symposium entitled "Americans Before Columbus: Ice Age Origins." The all day symposium will be attended by teachers, professors, students and the interested public. Educational material based on the symposium is planned for publication in FY 1988. The planning for future symposia related to the Quincentenary (to be held in FY 1988 and FY 1989) continued in FY 1987.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are provided by allotments which support planning and development of research and exhibition programs for the International Center and for administration of the Quincentenary Commemoration. A special purpose fund provides stipend support for international scholarly exchanges aimed at strengthening the Smithsonian's institutional linkages.

Restricted Funds - These funds are provided from gifts, grants and other donations from individuals, foundations, organizations or corporations for specific purposes, such as mounting exhibitions and staging performances, film showings, and other public presentations in the International Center.

AMERICAN STUDIES AND FOLKLIFE PROGRAMS

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	8	750	12	644	--	69	--	136	--	676
FY 1988 Estimate	8	806	14	854	--	79	--	440	--	1,499
FY 1989 Estimate	10	925	14	795	--	68	--	499	--	1,729

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of American Studies and the Office of Folklife Programs are engaged in the study of various aspects of American society. The Office of American Studies seeks to advance knowledge in the field of American material and folk culture by individual staff research and by conducting a program in which graduate students are encouraged to advance knowledge through their own research. Dissemination of the knowledge thus advanced is accomplished through teaching, lecturing, and publication of the results of that research. The Office of Folklife Programs performs research on, prepares publications about, produces performances of, and strives to conserve living folklife traditions. For FY 1989, an increase of 2 workyears and \$119,000 is requested to provide staff and related support for Folklife archival holdings (2 workyears and \$54,000), and to continue preparations for the commemoration of the Quincentenary in 1992 of the Columbus Expedition (\$65,000).

PROGRAM - I. The Office of American Studies: The Office of American Studies sponsors a graduate program in American material culture in cooperation with various universities located in the Washington, D. C., area and in other cities. Three or four seminars a year are offered for academic credit and are taught by the director of the program and by cooperating scholars.

The graduate program in American material culture provides a means for scholars and students to pursue American studies utilizing the unique resources of personnel, objects, manuscripts, and books available in various bureaus of the Smithsonian. It provides opportunities for graduate students in American studies or American history departments of affiliated universities to undertake a program of formal course work at the Institution.

II. The Office of Folklife Programs: The Office of Folklife Programs engages in the study, exhibition and conservation of Folklife traditions. The most visible result of these endeavors is the annual Festival of American Folklife, which since its inception in 1967 has drawn an estimated 15 million visitors. The Festival has

proved to be an educational and enjoyable opportunity for the public to learn about American and foreign cultural traditions. In addition to sponsoring the Festival, the Office serves the members of traditional cultures by providing national recognition to their traditions, maintains an archive of traditional performances and cooperates with government agencies to advance the Nation's interest in folklife.

Research and Publications - The Office is currently engaged in, or has completed, research projects on Michigan folklife, Massachusetts folklife, Washington, D.C. folklife, the traditions of the elderly, diverse American linguistic communities, the Ojibwa wild rice culture, Great Basin music, Appalachian flat foot dancing, traditional Mexican bread making, African epics, Indian festivals and puppetry traditions. The results of this research are disseminated through the award winning annual Festival program book, articles in journals, books, films, radio programs, scholarly presentations and the Smithsonian Folklife Studies Series. The Folklife Studies Series (which couples monographs and documentary films) has in FY 1987 released The Korean Onggi Potter. Other recently completed projects include a monograph on the Ojibwa, a booklet on Indian fairs and festivals, a radio series on American musical traditions, and an Academy Award winning film on Italian-American stone carving. The Office has been given editorial responsibility for the Institution's recently acquired Folkways Records collection. Planning for the establishment of consultative boards and editorial procedures is currently under way. The Institution's acquisition of Folkways records represents an unparalleled opportunity to develop research, publications, and outreach programs that educate a broad public to the richness and variety of folk and traditional music, narrative and historically significant oratory.

Exhibitions - The Festival of American Folklife, which has evolved into the largest annual cultural event in the Nation's Capital, has stimulated interest in and provided a model for the research and presentation of traditional cultures. Currently, the Office is working on Festival projects with Michigan, Massachusetts, Missouri, Vermont, New Mexico, Puerto Rico, northwestern and midwestern states, and with the nations of China, Pakistan, India, Indonesia, Canada, the Soviet Union and the Arab Gulf States.

In FY 1987, the 21st Festival featured the traditions of Michigan, the traditional music of the District of Columbia, and the cultural conservation of American language traditions. The Festival, which drew approximately one million visitors, generated massive media attention and critical acclaim. In FY 1988, the Festival will feature the traditions of Massachusetts, the role professional folklorists have played in the conservation of traditional cultures (in order to mark the centennial of the American Folklore Society), and the second of a continuing series on the folklife of the District of Columbia. Under discussion are a musical program from the Soviet Union and one on Folkways Records artists.

The Office has provided curatorial leadership for "The Grand Generation," a Smithsonian Institution Traveling Exhibition Service (SITES) exhibit scheduled to open in November 1987, which, based upon a previous Festival program, highlights the role of the elderly in preserving and promulgating cultural traditions. The Office has also provided curatorial support for "Generations," the inaugural exhibit for the International Center.

Archives and Education - The current Office archives holds approximately 15,000 audio tapes, 1,000 videotapes, 400,000 photographic images, 500,000 feet of

motion picture film and over 10,000 paper files encompassing the research, documentation and presentation of thousands of folk cultural traditions from all parts of the United States and some 45 countries. Highlights include materials on occupational folklife, family folklore, American musical traditions, narratives, ethnic and Native American performance traditions.

The archives are invaluable in handling scholarly inquiries and general informational requests. In addition, the archive is a valuable resource for those conducting research. In FY 1987, the resources of the archive were utilized by visiting fellows conducting research on such topics as the creation of cultural identity in public festivals, Hispanic performance, black American narrative, Indian folk culture and Italian-American traditions. The Office is in the process of accessioning the Moses and Frances Asch Archives, a collection of materials compiled over the 40-year history of Folkways Records. Comprised of field records, ethnographic documentation and notes, early phonograph records and correspondence, among other things, the archives will be a rich source of data for future researchers, and for the development of musical and cultural educational materials.

EXPLANATION OF PROGRAM INCREASE:

Office of Folklife Programs: Folklife Program Archives Staff and Support costs (2 workyears and \$54,000). For FY 1989, an increase of 2 workyears and \$54,000 is requested to hire an archivist and archives assistant and to begin audio tape preservation and automation of research interview data.

The archives are an essential part of office operations and are used for research purposes by Office staff, Smithsonian fellows, outside scholars and students, and the interested public. The requested increase will meet three needs that currently threaten the continued and optimum use of archives. First is the need for a permanent archivist on staff. Second is the need to copy onto a stable medium documentary materials which are physically decomposing. These irreplaceable materials are in danger of being lost forever. Third is the need for greater accessioning and cataloging efforts, which have not been able to keep pace with the growth of archival materials, documents, tapes, photos, and field research reports.

The re-recording of research interview data originally recorded on aging acetate-backed tapes will preserve this scientific, cultural and historical information on tapes with a much more durable backing. In addition, more than 12,000 Office-generated ethnographic report forms on contemporary folk artists will be entered into computer database files. This will increase accessibility and usefulness of this data to scholars and will form the kernel from which a cross-indexed information retrieval system for all archival materials will grow. The increased support will also accelerate the rate at which new documentation is accessioned, indexed, and, in appropriate cases, copied and sent to state archives.

At present, the archives are supported on a temporary basis subject to the availability of lapsed salary and other funds. The importance of this documentation suggests that its maintenance and development as a research resource be placed on a permanent basis. The requested increase will allow Folklife to hire two positions and provide for contracts and supplies for conservation and data entry, and preserve the unique historical and cultural materials and a nationally important data base for folkloristic scholarship.

Columbus Quincentenary Project (\$65,000) - For FY 1989, an increase of \$65,000 is requested to continue initiatives begun in FY 1987 for the Columbus Quincentenary. Added to base funds received in previous years, which support research, clerical support, meetings of an advisory board of scholars and administrative travel, the increase will support travel and fees for symposia, the contracted services of an editor and folklorist, and costs associated with additional research and printing.

The Office has been assisted by its advisory board of distinguished scholars in planning a Quincentenary project particularly suited to the Office's and Institution's research strength and development. The project explores the cultural consequences of the cultivation and use of particular, historically important crops associated with the historic encounter of civilizations begun by Columbus. A series of symposia, "living museum" exhibitions, films, publications and sound recordings will examine the cultural and social systems within which selected food and cash cropping systems were embedded, with particular attention to the traditional, expressive and aesthetic forms associated with those cropping systems.

Three symposia topics, "The Seeds of the Past," "The Seeds of Commerce," and "The Seeds of Industrialization" will be the subject of an exchange of research results and analyses among scholars from throughout the Western Hemisphere. The symposia will result both in a published anthology and the plans for living museum exhibitions to be mounted at the Smithsonian in 1991 and 1992. The project will be based on several forms of collaboration with foreign scholars and institutions, from program planning to exhibit design and implementation; and, finally, to the development of ancillary outreach vehicles to ensure the broadest possible diffusion.

In FY 1989, the requested increase will support the second scholarly symposium of the series, entitled "The Seeds of Commerce." This will focus on the cultural consequences of crops such as sugar and tobacco which were the object of significant pre-industrial trade between Europe and the Americas. The increase will also enable the Office to collaborate with research institutions in Caribbean countries in support of a subsequent symposium on the same topic to be held in the Caribbean. The results of these scholarly meetings will be compiled and published. The requested increase will support research for "living museum" exhibitions in 1991 and 1992 and for a publication in the Office's monograph/film series.

Provision of these funds will allow the rational and timely development of the Office's Columbus Quincentenary project and will preserve collaborative ties with scholars and institutions in Latin America and the Caribbean.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds: I. Office of American Studies: Tuition reimbursement is received from the cooperating universities, principally the George Washington University and the University of Maryland, whose graduate students avail themselves of the courses offered by the Office of American Studies. The tuition reimbursement is designed to reimburse the Smithsonian for the use of its facilities by the students participating in Smithsonian classes and, in addition, to provide honoraria and reimbursement for the services of outside experts participating in the program.

II. Office of Folklife Programs: Funds are provided by allotments and from concessions and sales relating to the Festival of American Folklife. These funds support the salaries as well as related support costs. Funds are also available from the Institution's Educational Outreach Program.

Restricted Funds - Funds are provided in the form of individual gifts and grants from private foundations and corporations and are used to fund specific programs or components. Funds in FY 1987 provided partial support for the Metropolitan Washington, D.C. Music program and the narrative component of the Michigan program at the Festival of American Folklife.

Government Grants and Contracts - These are provided by various state and local governments for support of performances and programs at the annual Festival. In FY 1987, funds were received to support the costs of highlighting the folklife traditions of the State of Michigan. Additional grant support is anticipated in FY 1988 from the Commonwealth of Massachusetts.

INTERNATIONAL ENVIRONMENTAL SCIENCE PROGRAM

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	13	742	--	--	--	--	--	--	--	--
FY 1988 Estimate	13	750	--	--	--	--	--	--	--	--
FY 1989 Estimate	13	750	--	--	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The International Environmental Science Program (IESP) is a multi-bureau, interdisciplinary effort to coordinate the Institution's long-term monitoring and study of unique and significant ecosystems. The goal of the Program is to evaluate and eventually predict the impact of human activities and natural change on selected ecosystems. Research sponsored by the IESP occurs at two permanent Smithsonian sites--the Tropical Research Institute in Panama and the Environmental Research Center in Maryland--as well as at several non-permanent sites throughout the world. No program increase is requested for FY 1989.

PROGRAM - The International Environmental Science Program sponsors research to meet the urgent need for long-term studies of the world's ecosystems, especially in tropical and subtropical regions where the rapid rate of tropical deforestation, loss of suitable soil and resulting threat to wildlife are of critical importance. The Program provides funds for teams of scientists to monitor natural variations in specific environments that are still unstressed by humans. Recent United States Government and international commissions have reemphasized the need to expand long-term monitoring activities to gain further insight into biological diversity and to assist in the survival of rapidly disappearing ecosystems.

Permanent IESP research sites are maintained at the Rhode River Estuary at Edgewater, Maryland; the tropical lowland forest of Barro Colorado Island (BCI); and the Galeta Reef on the Atlantic side of the Panama Canal. For over ten years, scientists have developed a data base on the biological, physical and chemical components of these ecosystems. Analyses of this data have produced concepts and verifiable hypotheses on the long-term patterns in climate, and the stresses and disturbances resulting from human activity.

Research sponsored by the IESP is also conducted at non-permanent sites in Aldabra, Nepal, Venezuela, Brazil, and Amazonian regions of Peru and Bolivia. Smithsonian scientists, with support from the host governments, are continuing their efforts to gather descriptive data at these sites that will aid in the

development of verifiable hypotheses concerning genetic diversity, animal management, and natural area management.

Highlights of recent IESP research accomplishments at the Program's permanent and non-permanent sites for FY 1987 are summarized below:

Edgewater, Maryland - In order to assess the impact of acid rain on eastern coastal plain hardwood forests, a detailed acid budget was measured over a 4-year period for a mature forested drainage basin. Precipitation was primarily a dilute solution of nitric and sulfuric acids while the stream water draining the basin was primarily a solution of magnesium, calcium, sodium and potassium sulfates and chlorides. The differences between inputs from acid rain and stream exports reflect the nearly complete retention of ammonium, hydrogen, and nitrate ions; the partial retention of sulfate; and a net loss of metallic cations such as potassium and calcium from the watershed. The watershed ecosystem neutralized 98 percent of the acidity in precipitation, but the remainder was sufficient to acidify the stream draining the forest. All of the nitric acid from acid rain is retained by the ecosystem without detrimental effects upon the forest or stream. Sulfuric acid was the acidic pollutant responsible for the cation losses and stream acidification.

The changes in acidity of forested streams were more related to changes in precipitation acidity over time than were the changes in acidity of agricultural streams, reflecting the importance of other major terrestrial sources of acidity on agricultural systems. Surges in acidity and dissolved aluminum concentration in primary streams reached extremes of pH 3.2 and 300 ug Al per liter. Larger streams were also observed to have surges in acidity with pH minima below 5.0. Surges in acidity occurred during accelerated groundwater percolation following storm events and did not coincide with surface runoff or snowmelt. These acid surges and aluminum concentrations are highly toxic to aquatic animals, especially during their larval stages.

One of the limiting factors for productivity in Chesapeake Bay is sunlight penetration. A year-long study of incident sunlight and underwater light penetration in a tidal tributary to Chesapeake Bay found that both the intensity and color of penetrating sunlight responded to changes in the concentration of suspended soil particles and phytoplankton. Light attenuation was higher in the upper part of the water column under sunny, clear skies than on cloudy days. This was due to higher concentrations of pigments and suspended particles in the water on sunny days and the diffuse character of sky light on cloudy days. Thus, even though incident sky light is much less intense on cloudy days, this sky light is not attenuated as rapidly in the water column. Therefore, productivity is not as limited by low light intensity on these cloudy days as previously believed. Variation in eight water quality parameters explained up to 93 percent of the variation in the light attenuation. Chlorophylls a and c and mineral suspensates were the three most important variables for light attenuation under clear skies. These results allow us to calculate underwater light intensity and color in the Chesapeake if sky conditions and selected water quality factors are known.

Panama - IESP funded research on Barro Colorado Island has provided important new information on how water and light control forest structure and productivity, information of major significance to the development of techniques for agroforestry and reforestation. The BCI forest irrigation project is entering its third year. Experimental elimination of soil drought stress over the past two dry seasons has

yielded fundamental insights into forest dynamics. Although several plant species showed altered patterns of growth and reproduction in response to irrigation, many did not. Thus, factors other than soil moisture, such as relative humidity and day length, are also influencing phenological patterns -- a result of importance for applied forestry programs. Use of new computer image processing technology (largely funded by IESP) to analyze photographs of the forest canopy has resulted in a major breakthrough in the analysis of the forest light environment on BCI. A precise and accurate description of understory light environment has been developed, permitting analyses of responses of forest plants to light on a spatial and temporal scale never before attempted. This provides information necessary for management programs that improve growing conditions for economically important forest tree species.

Long-term monitoring of reef and mangrove communities is continuing at Galeta, providing invaluable background for analyses of the impact of the April 1986 oil spill on these areas. These IESP funded studies are now being supplemented by a \$3 million five-year contract to STRI from the Minerals Management Service of the Department of the Interior. This contract was awarded because of the unequalled biological record provided by IESP at Galeta, and because this basic monitoring will be continued in the future.

Aldabra - Continued surveys of the flora and fauna of the atoll were carried out by a team of seven scientists. A further 20 quantitative samples were taken in seagrass beds for analysis of infaunal composition. A survey of eight limestone sinkholes on Picard Island was initiated. Qualitative and quantitative sampling plus measurements of tidal range, water temperature and salinity, and physiological tolerances of some of the common shrimp species will be combined to explain anomalous distribution patterns in the sinkholes. Collecting of terrestrial fossils doubled the number of extinct bird species: a shearwater, hawk, booby, and gull were recorded. Pleistocene-Holocene land molluscs were collected from previous sites plus several new ones. This will supplement the Smithsonian collections. A few new taxonomic records occurred. Polychaete worm studies included collecting in rubble for eight or nine species being surveyed for variability; in mangrove algal mats for a quantitative characterization of the benthic community; and in the limestone sinkholes for part of a worldwide taxonomic study of fabriciine worms. The marine isopod survey was continued with ten stations in a variety of habitats. Numbers of rare species in the collection were increased, and several new species discovered.

Nepal - The major achievement of the IESP funded Smithsonian-Nepal Terai Ecology Project was the translocation of nine one-horned Asian rhinoceros from Royal Chitwan National Park to Royal Bardia Wildlife Reserve. This event brought the total number of translocated rhinos to 13 and allows for better management of this highly endangered species in another favorable habitat, thereby improving survival chances. The Chitwan population is the best studied population of these endangered mega-mammals, and new findings coming to light will be used to improve management of the rhino and its habitat. Recent findings show the rhino to be a major "landscape architect," whose effect on the habitat is pronounced and long-lasting. In addition, it was found that the breeding male population undergoes a high rate of turnover, which augurs well for maintaining the genetic variability of the population.

Venezuela - A total of seven research projects were conducted at the field site at Hato Masaguaral, Venezuela. Research on the red howler monkey continued to

focus on the relative importance of demography, kinship and dominance on the social interactions within groups of this species. The social groups selected for this study included newly formed groups, groups with long-term stability of adult male membership and groups with rapid turnover of adult males. Observations of these groups also enabled the investigation of the influence of newly formed groups on the ranging patterns of long established groups. In addition, 75 individuals of the population were immobilized and marked this year and milk samples were collected for nutritional analysis from 15 lactating females. This is the first time that such analyses have been undertaken for any free living New World primate species. Currently large cages are being constructed at the field site to house a group of red howlers for detailed studies on the nutritional aspects of the diet of this species. As with red howlers, the field investigations on Cebus monkeys (which is in its tenth year) dealt with the determinants of social interactions in groups with known genealogy and demography. The long-term studies on the two monkey species provide the most complete and detailed investigations on any population of sympatric primates found in South America.

The research on the Snail kite, a bird which is listed as endangered in the United States, focused on polygamy in this species and the details of its unique patterns of mate desertion behavior; i.e., if snails are abundant, either parent may desert its mate about halfway through caring for the young and may find a new mate and re-nest. Brood manipulation experiments are now being conducted to determine if the sizes of broods have an effect on mate desertion behavior of males and females.

The other four research projects conducted in Venezuela include studies on caimans, hoatzins (an avian leaf eater), white-tailed deer and two local bird communities.

Brazil (Golden Lion Tamarin Project) - During FY 1987, scientists have been closely monitoring the released golden lion tamarins at two sites in Brazil (Poco das Antas Reserve and Pesagro, an agricultural station). Three groups, totaling eight animals, remain from the original animals released in FY 1984 and FY 1985. A total of three litters has been born to released tamarins, from which three young survive. Major causes of death of released animals include predation and disease. An analysis of survivorship has revealed that younger animals survive better, especially if reintroduced within their family group. Techniques for training captive-born golden lion tamarins in the wild have been developed to test if the release program can be made more cost effective. In FY 1987 and FY 1988, scientists plan to release four untrained family groups on non-Reserve property, thus (1) involving local landowners directly in conservation and (2) making Smithsonian preparation and training techniques more cost effective. Other studies of wild golden lion tamarins continue. Although the vast majority of groups appear to contain a monogamous breeding pair, there are instances of polygyny and polyandry. Monitoring is intended to continue on the wild population so that scientists can characterize the age and sex structure of the species as well as the dispersal patterns of young over the long term. It is planned to test theoretical predictions concerning the genealogical relationships of adults that assist in rearing young to determine if "helpers" help due to kin selection or reciprocal altruism. Researchers are continuing the genetic analysis of the tamarin population in the wild and captivity, and have initiated a survey of small mammal densities and distribution, a study of tamarin energetics and an investigation of feeding ecology, diet, and nutrition in golden lion tamarins. Activities in conservation education continue, with the reevaluation of local attitudes towards conservation

issues now being analyzed to determine if, and which, educational materials have an impact on the attitudes and awareness of the local community. A manual for conservation education programs is being developed and a workshop will be held for park and reserve education personnel. Additionally, scientists continue to monitor and protect the condition of this very endangered habitat with its unique fauna through the control and regulation of hunters, squatters, and fire. During FY 1987, considerable activity centered on identifying additional suitable habitats for tamarins on private land where tamarins could be released.

Brazil (Neotropical Lowland Research Project) - Field and laboratory work on the Amazonian and Atlantic Forest biota was done in Archeology, Botany, Entomology, Fishes, Herpetology, Birds and Mammals. Results of these investigations added important new information on the composition and distribution of the Neotropical biota. These data are important for completion of several major publications and conservation planning. Specific highlights during the past year include the holding of an "International Workshop on Neotropical Distribution Patterns," co-sponsored by the Smithsonian Institution and the Academia Brasileira de Ciencias with additional support provided by the National Science Foundation and the Conselho Nacional de Desenvolvimento Cientifico es Tecnologico. Six papers by Smithsonian participants were given at the scientifically rewarding workshop. At the invitation of the Academia Brasileira de Ciencias, a multi-disciplinary team of Smithsonian aquatic entomologists, herpetologists, ornithologists, and mammalogists made a preliminary intensive formal survey of a proposed dam site on the Rio Xingu. Based on study of the collections, conservation recommendations were forwarded to the appropriate Brazilian agencies.

Evaluation of Program - The International Environmental Science Program is involved in an ongoing process of evaluation to ensure the quality of the research. The IESP programs regularly are subject to peer reviews. In FY 1987, participants in the Brazil (Amazon) project met in Rio de Janeiro for an international meeting to share research results to date. These efforts were critiqued by a group of internationally distinguished scientists, and will form the basis for a new book. The meeting also served to frame research priorities for this project over the next five years.

Over the next five years, it is anticipated that work will continue at all Program sites. Selected new initiatives will be undertaken in the future to improve the Institution's capabilities in monitoring additional subtropical and tropical sites. The loss of habitat in these areas makes it essential that scientific data be gathered now on areas that may disappear, and to assist in developing plans to conserve other areas before they are lost.

ACADEMIC AND EDUCATIONAL PROGRAMS

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	19	838	11	711	--	1,911	--	227	--	--
FY 1988 Estimate	20	971	11	708	--	2,004	--	146	--	--
FY 1989 Estimate	22	1,157	11	740	--	2,009	--	95	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Research and education are among the principal objectives of the Smithsonian. To attain these goals, the Institution promotes scholarly and academic ties with other learned institutions, and offers its resources to the general public as well as the academic community. Scholarly and academic ties are developed and maintained through competitive awards for research projects, programs in higher education, symposia and seminars and learning opportunities at the elementary and secondary school levels. Included in this line item are the Office of Fellowships and Grants, the Office of Interdisciplinary Studies, the Office of Elementary and Secondary Education, and the National Science Resources Center.

For FY 1989, an increase of 2 workyears and \$186,000 is requested to provide expanded support for ongoing seminar series; to support regional workshops for museums and schools; to support the development of educational materials for preschool teachers and students in commemoration of the Columbus Quincentenary; to establish and maintain teaching resource collection and data base; and to provide clerical support for the National Science Resources Center (NSRC) administrative staff.

PROGRAM - I. The Office of Fellowships and Grants - The Office of Fellowships and Grants (OFG) manages Smithsonian Fellowships, other stipend appointments and various support programs intended to enhance research, to foster communication and collaboration between the Institution and universities, museums and research centers situated in the United States and abroad, and to ensure the full use of Smithsonian resources. The collections and facilities of the Smithsonian, as well as the curators and scholars who use them, offer unparalleled and essential resources for specialized study. The various forms of financial support offered by the Institution provide greater access to these resources and thereby offer a unique compliment to university scholarship. Fellowships and other awards, which are offered primarily with Trust funds, support research in all areas of the

Institution and promote interdisciplinary projects which draw upon the resources of several bureaus.

The Office of Fellowships and Grants administers a number of programs which enable students and scholars to visit the Institution. In FY 1987, 99 predoctoral and postdoctoral fellows received awards through an Institution-wide program. Twenty-one of these recipients were foreign students and scholars from 13 countries. Under the Short-Term Visitor Program, 185 appointments were made with funds allotted to OFG to allow visitors to come to the Institution, for periods ranging from a few days to several weeks, to work in collaboration with the research staff. This program especially strengthened our international ties, with 89 participants representing 33 foreign countries. In addition, fellowships were provided with Trust and Federal funds designated to the bureaus for specific purposes. The Regents Fellowship program continued to bring eminent scholars to the Institution. In FY 1987, three Regents Fellows began their residencies. Several senior fellowships also were awarded using bureau funding. The Office manages the James E. Webb Fellowship, which promotes excellence in the management of cultural and scientific not-for-profit organizations. In FY 1987, one person from within and one person from outside the Institution were awarded fellowships to allow them to pursue and enhance their specific administrative goals. The Office of Fellowships and Grants also administered stipends for Smithsonian Internships to 136 students in FY 1987.

Programs of research support are available to Smithsonian staff through the Office of Fellowships and Grants. The Scholarly Studies Program provides awards on a competitive basis to fund research projects of particular merit and promise which are not readily accommodated through the Federal process. Thirteen awards of one and two year duration were offered for individual and team investigations in FY 1987. Some of these awards involved scholars from other institutions. The Workshop Program also provides funding to Smithsonian staff to enable them to organize and support workshops, seminars and symposia which draw together scholars worldwide to discuss a variety of specific subjects. In FY 1987, eight activities of this kind were wholly or partially supported with these funds.

A number of programs designed to increase minority participation in Smithsonian opportunities for research and study are administered by the Office. Thirty-one students participated in the minority internship program. In addition, two minority students were provided funding through the Cooperative Education Program and two minority students were offered Education Fellowships. Both programs strive to promote increased minority representation in the professional research staff of the Institution. The Native American Program, which facilitates access to Smithsonian Native American collections and resources offered appointments to six Native American students and scholars. The Visiting Associates Program, designed to introduce the Smithsonian to academic faculty and administrators committed to furthering minority education, held two five-day sessions to disseminate information about the Institution's research activities and support opportunities. This year one award was offered through the Faculty Fellowship Program to a minority faculty member. One past Faculty Fellow from Howard University together with another Faculty member introduced eight undergraduates from Howard to tropical biology by organizing a field course that was conducted at the Smithsonian Tropical Research Institute. The course was funded through the Smithsonian Educational Outreach Program.

II. The Office of Interdisciplinary Studies (OIS) - The Office changed its name from the Office of Smithsonian Symposia and Seminars to communicate more

clearly its mission: exploring gaps in knowledge and delivering new results of scholarship in the physical, natural, and human sciences and the humanities, for the purpose of strengthening integrative learning inside and outside the Institution. The interdisciplinary approach is a holistic, inclusive one whose importance is receiving growing recognition. The Office seeks to demonstrate that increasing and diffusing knowledge, the terms of the Smithsonian's mandate, are interdependent parts of the same process.

The Office continues to regularly convene scholars and other specialists at major symposia in the Smithsonian's international symposium series, at seminar series, and special programs, all of which focus on themes of current significance and public interest. These programs, usually undertaken with the collaboration of other research and professional institutions as well as staff and bureaux around the Institution, are intended to improve access of the practitioners, patrons, and users of research to one another and thereby encourage the flow of ideas. The Office produces books and educational materials based on these scholarly programs. It also serves as a Smithsonian link with partners in the world of higher learning, acting as a resource center for visiting scholars and students and representing the Smithsonian at national and international meetings and commemorations.

Of major importance in FY 1987 was the ninth international symposium, "Constitutional Roots, Rights, and Responsibilities." The five-day program, the scholarly centerpiece of the United States' observance of the Bicentennial of the Constitution, brought together 68 participants from 12 countries. Discussed were such topics as the origin of written and unwritten constitutions; the development of the Supreme Court doctrine on civil rights and changes in Constitutional interpretation; the origin of rights; the status of state constitutions and American Indian constitutions; the comparison of national constitutions; the influence of technology on government; the impact of Supreme Court decisions on women and minorities; and the interplay of rights and responsibilities in a democracy. Large audiences were in attendance; part of the proceedings were broadcast nationwide by C-Span and overseas by the Voice of America and Worldnet. Essays will be published in a forthcoming volume.

In addition to the symposium volume, the Office will produce a one-half-hour video documentary for high school students entitled "Rights at Risk: The Responsibilities of Citizenship."

The Office is preparing another program to observe the Bicentennial of the Constitution, "Afro-Americans and the Evolution of A Living Constitution." It is scheduled for March 1988, and will be organized in conjunction with the Joint Center for Political Studies. This symposium will address the impact that Afro-Americans' search for full citizenship has had on Constitutional law in the 19th and 20th centuries and its influence on other domestic groups.

"Creativity in the Arts and Sciences" will be the theme of the September 11, 1987, symposium celebrating the opening of the Arthur M. Sackler Gallery. To be held at the National Academy of Sciences, under Smithsonian auspices, the symposium will feature such scientists as Linus Pauling, Smithsonian Regent Murray Gell-Mann, Chen Ning Yang, Jonas Salk, Solomon Snyder and Donald Frederickson and such performing artists as Janos Starker, Rosalyn Tureck and Byron Janis. The encounters will stimulate dialogues intended to answer questions about the biological, social, and environmental bases of creativity, and to throw new light on giftedness in both the young and senior citizens. The late Dr. Sackler was

helping to plan the symposium at the time of his death. A film portrait of Dr. Sackler, excerpted from the TV series, "Smithsonian World," will start the symposium.

A new program has been launched specifically to foster a stronger sense of intellectual community among Smithsonian professional staff, recognize strengths and convergences of interest not immediately apparent in a specialized environment, and bring predoctoral and postdoctoral fellows more into the life of the Institution. This intramural seminar series, "Ways of Knowing," responds to the staff's expressed need for forums through which they can exchange ideas and methodologies and debate issues in a "neutral" (i.e., trans-departmental and bureau) setting. The first seminar will be held in October 1987.

The Office has begun consultation in various parts of the United States and abroad for ideas to be incorporated in the 1992 symposium, "Exploring the Unknown," as part of the Smithsonian's commemoration of the Columbus Quincentenary. These include Native American research and education institutions.

The Smithsonian will cooperate in two major scholarly events in 1987-1988. A November workshop will address science policies affecting research on exceptional abilities, under auspices of the Institute of Noetic Sciences, Sausalito, California. "The Heritage of Tyre" will be the focus of a symposium on the archaeology of that ancient city in Lebanon in January 1988. The American National Committee for Tyre will sponsor the symposium with the cooperation of the Smithsonian, the American Schools for Oriental Research and the Council for Overseas Research Centers.

To better understand American society in a world context--particularly United States communications problems with other cultures--the Office is planning a series of seminars, "Research on Contemporary Cultures and Civilizations," to start in 1988-1989. Cooperating institutions will be the Institute for Intercultural Studies, New York, the Institute for the Study of Diplomacy, Georgetown University, the Institute for Psychiatry and Foreign Affairs, and the International Monetary Fund.

As a unit of the public service arm of the Smithsonian, the Office serves both a broad general public and at the same time brings benefits to high schools, colleges, and universities seeking resources for the improvement of their curricula. Similarly, the symposia benefit practitioners of law, medicine, journalism, public administration and other professions. New efforts are under way to attract participation of business and labor leaders as well as minorities.

III. Office of Secondary and Elementary Education (OESE) - The OESE offers a number of programs to encourage cooperation and exchange of information between the Smithsonian and schools in the Washington, D.C., area. LET'S GO (a newsletter published five times each school year) informs teachers about the variety of educational opportunities available at the Smithsonian to teachers and students at all grade levels. This newsletter is sent to approximately 11,000 teachers in the Washington, D.C., area. During FY 1987, more than 300 participants attended a workshop and seminar program for teachers. Resulting from these summer courses, curriculum units based on the Smithsonian's collections were developed. Summer programs for teachers included a series of in-depth, one-week, fully-accredited seminars on such topics as "teaching life sciences through direct observation";

"using community resources to teach about the United States Constitution"; and "teaching American cultural history through art."

To share these same teaching concepts with a national audience, the Office distributes ART TO ZOO, a classroom journal, to approximately 65,000 teachers and museum education departments throughout the United States and circulates free of charge two slide loan packages, entitled "The Museum Idea" and "Museums as Story-tellers," which reach an estimated 3,000 students during the school year. In the spring of 1987, the Office sponsored a two-day symposium on "Teaching the Constitution," in which noted scholars and educators presented lectures and workshops to an audience of more than 150 teachers. The Office offered for the seventh straight year, in cooperation with the University of Virginia, a summer graduate course on using museums to teach writing. Beginning in September 1987, a precis of the symposium's sessions will be available free of charge to educators nationally.

During FY 1987, the Office continued its work to make Smithsonian programs accessible to disabled visitors by providing interpreters at special events, lectures, and tours, as well as by offering guidance to the various Smithsonian museums who are seeking ways to offer more effective programming for retarded, hearing-impaired and blind visitors. Sign language classes were given to teach approximately 75 Smithsonian educators, guards and other employees how to communicate with hearing-impaired visitors. Also, the Office published a manual and videotape package, designed to help museums, zoos, and historic sites across the country to more effectively serve disabled people.

IV. National Science Resources Center - The National Science Resources Center (NSRC) has been established by the Smithsonian Institution and the National Academy of Sciences to help reverse a deterioration in the quality of precollege science and mathematics education. Convinced that any effort to improve the quality of science education must involve both educators and scientists, the NSRC is working closely with state and local school systems, research scientists, educational and scientific organizations, and science museums to develop high-quality materials and programs that will meet the needs of classroom teachers throughout the Nation.

A major part of the NSRC mandate is to identify, develop, and disseminate science and mathematics teaching materials that are imaginative, classroom-tested, and scientifically up-to-date. The Center also organizes leadership-development institutes for school system personnel, to encourage the sharing of successful materials and programs, and to help build a talent pool to staff local program improvement efforts.

The NSRC has begun a project to improve the teaching of science in the Nation's elementary schools, called Science and Technology for Children (STC). During FY 1987, a four-week STC workshop brought together 70 scientists, elementary school teachers, science supervisors, and science museum educators to develop "hands-on" resource units for use by elementary teachers in grades one through six. The STC science units, which address important topics in life science, physical science, earth science, and technology, actively involve elementary school children in "hands-on" science investigations. These investigations develop children's problem-solving and critical thinking skills, while broadening their understanding of basic science concepts. The units will be field tested and disseminated in cooperation with a network of school systems, state departments of education, science museums, and university science teaching centers that are working together

with the NSRC to improve the teaching of science in the Nation's elementary schools.

The participants in the STC summer workshop included 50 elementary school teachers and science supervisors, representing 16 school systems across the Nation. These teachers and supervisors came from inner city school systems, rural schools, Native American schools, Department of Defense Dependents Schools, and suburban school districts. Twenty scientists from universities, science museums, and research laboratories also participated in the workshop.

In July 1987, the Secretary of the Smithsonian Institution and the President of the National Academy of Sciences established an Advisory Board for the National Science Resources Center. The membership includes representatives from several major United States corporations, eminent scientists, and educational leaders from throughout the country. The NSRC Advisory Board will advise and assist the NSRC's executive director concerning broad policy issues and will help set priorities for the Center's programmatic activities.

EXPLANATION OF PROGRAM INCREASES - For FY 1989, an increase of 2 workyears and \$186,000 is requested to provide expanded support for ongoing seminar series (\$35,000); to support regional workshops for museums and schools (\$15,000); to support the development of educational materials for preschool teachers and students in commemoration of the Columbus Quincentenary (\$38,000); to establish and maintain teaching resource collection and data base (1 workyear and \$63,000); to provide clerical support for the NSRC administrative staff (1 workyear and \$35,000).

II. Office of Interdisciplinary Studies - Expanded Support for Ongoing Seminar Series (\$35,000). For FY 1989, an increase of \$35,000 for the Office of Interdisciplinary Studies is requested to provide support necessary to carry out primary responsibilities for interdisciplinary activities: specifically, the development of a new seminar series, "Ways of Knowing," to which the Institution attaches great importance; the revival of the "Voluntarism and the Public Interest in American Society" series, which serves a broad constituency; and planning for the Columbus Quincentenary symposium (tenth in the international symposium series, "Exploring the Unknown").

The requested increase for travel (\$4,000) would permit two professional staff to conduct wider-ranging field research and liaison with individual scholars and research institutions than the director alone can accomplish. Also this increase would provide travel to the Smithsonian for visiting seminar speakers and program advisors. In addition to face-to-face consultations, communications with resource persons in the United States and abroad by telephone play a vital role in the development of programs (\$4,000). The increase in other services (\$10,000) will support the cost of honoraria for speakers and essayists; professional contractual services; and various event support services, such as security, audio- and video-taping.

An amount of \$6,000 will provide funds to publish a brochure describing the purposes and programs of the Office, and also offering a means to expand the number of contacts with other institutions and individuals. This increase will provide for production and distribution of educational materials such as occasional papers; an interdisciplinary studies newsletter; flyers to announce upcoming programs; and souvenir programs that serve as reference documents.

The increase requested for equipment (\$6,000) will be used to purchase office furniture and machines (e.g., file cabinets, computer furniture, etc.) and providing the capability of screening videotapes relating to programs. The Office also needs basic supplies and materials (\$5,000) including reference books and subscriptions to scholarly publications. Without these funds the Office's ability to carry out its mission effectively will be greatly restricted. It is anticipated that for FY 1990 funds will be sought for an additional program assistant.

III. Office of Elementary and Secondary Education - Regional Workshop Program. An increase of \$15,000 is requested to support a national outreach initiative for museums and schools. The purpose of this program is to improve the quality of the teaching of art, history, and science at the precollege level, through the establishment of ongoing partnerships between museums and schools. To date, nine communities from coast to coast have taken part in the Regional Workshop program. Three additional sites (Tucson, Arizona; Wilmington, North Carolina; and St. Louis, Missouri) have been selected for participation in 1988.

In the nine locations in which the Regional Workshops have been brought to completion, a total of 255 institutions have participated, reaching more than 3,500 teachers. Evaluations conducted at these nine sites show that the program has been successful not only in accomplishing the goals set forth at its inception, but in unanticipated ways as well. At its more basic level, the program has succeeded by: organizing each area's cultural institutions into cooperative working consortiums; and, providing them with the impetus, structure, and contacts to effectively conduct a major "in-service" event for teachers and school administrators. In addition, the program has provided each community with a major publicity drive, raising public awareness of both the participating museums and the Smithsonian. Moreover, of the nine consortiums created for the Regional Workshops, all but one remain viable working organizations. Six have filed for nonprofit status, and several have received grants from state organizations for other cooperative projects. Indeed the Regional Workshops have been so well-received in these communities that all will be (or have already been) repeated (without Smithsonian assistance). Clearly this program fills a national need in education in a way that promises to have a long-term impact.

The requested increase of \$15,000 will permit continuation and expansion of the Regional Workshop Program. Of this amount, \$8,000 will be required to fund the program at its present level (between four and five workshops); and \$7,000 will permit expansion of the program to include participation by more Smithsonian staff members, as well as to provide two to three additional workshops. Increasing the number of Smithsonian staff involved in the program would strengthen the quality of the program by providing each community with a broader realm of Smithsonian expertise--and at the same time it would give the Smithsonian museums and major offices an effective avenue for systematically sharing their programs with a national audience of teachers, students, and museum educators.

The \$15,000, then, would cover the cost of travel and per diem for OESE and other staff members participating in the program.

Quincentenary Materials. An increase of \$38,000 is requested to support the development of educational materials for preschool teachers and students in commemoration of the Columbus Quincentenary. This increase will be required for FY 1989 and FY 1990.

As an overarching theme, the Smithsonian's institution-wide Quincentenary program, "The Americas: Past, Present, and Future," will explore the intellectual, cultural, and ecological diversity of the Americas. As stated by Secretary Adams in his opening remarks for the 1985 Quincentenary Planning Conference, the Institution has a "responsibility to rectify [the] selectiveness and lack of historical depth in our popular perceptions of Latin America. The task before the Smithsonian is not to focus upon the 'discovery' of America by Columbus as a single event. Our focus needs to be on [the] larger and historically more important--not event--but process--five centuries of growth--that proceeded from that event in 1492."

With these broad Institutional objectives in mind, the OESE is now developing a number of programs for teachers and students, including initiatives in publishing and teacher education, which will be based on and funded through such already-existing activities as ART TO ZOO and summer seminars for teachers. In addition, but not as part of any existing program, the Office hopes to work with the Spanish Education Development Center in Washington, D.C., to develop, test, and publish a series of activity kits for preschool teachers and students--and it is for this effort that the requested funding is needed for FY 1989 and FY 1990.

The kits will be based on lessons that will be developed and tested during FY 1989 by an outside contractor working under the direction of the OESE. In FY 1990, the materials will be revised and published for distribution beginning in 1991. All materials will be tested at various stages of their development in a number of different schools, enabling the Office to fine tune them before publication. Throughout this process of testing and revision, the Office will be able to ensure the appropriateness of the kits' content, format, and educational level.

The kits will draw on the resources of a number of different Smithsonian museums and the National Zoo. In developing the units, the OESE will consult frequently with appropriate museum education departments and curatorial divisions, especially within the National Museum of Natural History.

Providing the teachers with all the materials necessary to teach a series of lessons, the finished kits will consist of detailed lesson plans, as well as materials for the students to use. All of the lessons will incorporate an experiential approach to learning, proven to be extremely successful with young children. Especially important among the student materials will be the inclusion of three-dimensional objects, including reproductions of artifacts and specimens from the Smithsonian collections.

The kits will be loaned to preschools and community center programs for young children throughout the United States and Latin America. Through a system now in place for disseminating educational materials nationally, the OESE will serve as the distribution center for the United States. Distribution in Latin America will be managed by the Organization of American States (OAS). Using its network of contacts with Latin American and Caribbean Ministries of Education, the Education Department of the OAS will assume responsibility for distributing at least one copy of the entire series to each country. The Ministries will then become the loan centers for their respective countries, aided by the OAS in advertising and maintaining the kits. This method will allow maximum use of the materials while keeping maintenance and mailing costs to a minimum.

The requested increase will allow the Office to hire a full-time contractor (\$27,000) and consultants (\$1,000) as well as initial production costs of kit materials (\$10,000).

IV. National Science Resources Center (2 workyears and \$98,000) - For FY 1989, an increase is requested to enable the NSRC to: establish and maintain a teaching resource collection and information data base of science and mathematics teaching resources (1 workyear and \$63,000); and to provide clerical support for the NSRC core administrative staff (1 workyear and \$35,000).

Establish and Maintain NSRC Teaching Resource Collection and Information Data Base (1 workyear and \$63,000). An increase is sought to hire a data base specialist/resource center librarian to establish and maintain the teaching resource collection in the NSRC science and mathematics curriculum resource center (1 workyear and \$35,000). This person also will design and maintain an on-line computer information data base of science and mathematics teaching resources. The data base specialist/resource center librarian will respond to requests for information and assistance from teachers and curriculum specialists in state and local school systems throughout the Nation.

Other support costs for this position include computer equipment (\$6,000) to establish the computer information data base of science teaching resources and the on-line telecommunications link. Funds also are requested for travel (\$2,000), printing and reproduction (\$6,000), consultant and other services (\$6,000), and the supplies and materials (\$8,000) needed to establish and maintain the NSRC science and mathematics curriculum resource center.

Widening the Smithsonian's educational outreach through the development and dissemination of new teaching materials is one of the Secretary's areas of emphasis. The establishment of the NSRC curriculum resource center will help the NSRC respond to this priority, by providing facilities and resources that can be used by people participating in NSRC materials development workshops and leadership development institutes. The NSRC's computerized information data base of these science and mathematics resource materials will be used by people participating in NSRC resource development projects, and will be made available to science educators and teachers throughout the Nation, by means of a computerized telecommunications network.

Provide Clerical Support for NSRC's Core Administrative Operations (1 workyear and \$35,000). The NSRC also requests an increase of 1 workyear and \$25,000 to provide clerical support for the NSRC administrative staff. In addition, an amount of \$10,000 is requested for printing and reproduction of materials, consultant and other services, and office supplies and materials, necessary for the NSRC's core administrative operations.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - I. Office of Fellowships and Grants - These are provided from allotments which are designated primarily for an Institution-wide program of graduate student, predoctoral, postdoctoral, and senior postdoctoral fellowships, as well as opportunities for shorter visits from scholars and students.

The Regents Fellowship program continues to bring distinguished visiting scholars to the Institution. Funding also is provided to support stipends for minority internships and faculty fellowships, for minority students pursuing graduate degrees under the Education Fellowship Program, and stipend support for the Native American Fellowship Program. A program allotment supports a small portion of the administration of the Office of Fellowships and Grants academic programs.

II. Office of Interdisciplinary Studies - An allotment is provided for salaries and support of OIS programs. In FY 1987, funds were primarily directed toward the "Constitutional Roots, Rights, and Responsibilities" symposium.

III. Office of Elementary and Secondary Education - As part of the Institution's affirmative action effort, a Career Awareness Program (CAP) for the District of Columbia Public Schools introduces minority young people to career opportunities at the Smithsonian. The OESE plans and runs the CAP with help from the various Smithsonian museums, whose staff members work directly with the students, providing first an overview and then a more in-depth experience of a wide range of Smithsonian careers. During the 1986-1987 school year, ten students from a District of Columbia high school participated in CAP programming at the Hirshhorn Museum and Sculpture Garden. Through the District's Summer Youth Employment Program, arrangements have been made for 63 CAP graduates from this and past years to work at the Smithsonian during the summer of 1987. The CAP-LET, a quarterly newsletter, helps maintain the graduates' involvement in the program. In addition, after extensive evaluation of the CAP, plans are under way to extend the program nationally through development of a manual and curriculum package for use by teachers and museum educators. These materials, slated for publication in FY 1988, are designed to enable local museums to institute programs that will interest minority young people in museums and museum careers.

In FY 1987, the Office continued to sponsor regional workshops in communities across the United States for the purpose of promoting the use of museums as educational resources. Among the regions to hold major one-day events in FY 1987 were Shreveport, Louisiana; Philadelphia, Pennsylvania; Waterloo, Iowa; and Jackson, Michigan. Communities which have begun working with the OESE to plan events for FY 1988 include Wilmington, North Carolina; Tucson, Arizona; and St. Louis, Missouri. Approximately 500 teachers are reached by each of these workshops.

Now in its second year, the Internship Program for High School Teachers, brought to the Smithsonian for an in-depth experience five teachers from communities where Regional Workshops had been held. Designed to have a multiplier effect by training master teachers to serve as catalysts for the creation of more effective museum/school programming in their home communities, this program carries three graduate credits from the University of Virginia.

A High School Summer Intern Program, now in its 13th year, gives 40 graduating seniors an opportunity to participate in a learning/service program at the Smithsonian, working behind the scenes with curators and other museum professionals. Young people from all 50 states and the District of Columbia are eligible to apply for admittance to either of two five-week sessions. Successful candidates received free lodging and transportation to and from Washington as well as a \$500 stipend.

IV. National Science Resources Center - An allotment from unrestricted funds provides partial funding for the core operations of the National Science Resources Center. These resources provide support for the NSRC executive director, program director, and also provide the core support necessary for the development of program initiatives to attract further support from the private sector in alliance with the National Academy of Sciences.

Restricted Funds - I. Office of Fellowships and Grants - These consist of restricted endowments, gifts and grants from individuals and foundations which specify their use for a particular project. For example, an endowment from the Walter Rathbone Bacon Scholarship supports awards for research on fauna from outside the United States, the James E. Webb Fellowship Program is designed to promote excellence in the management of cultural and scientific organizations, and a Rockefeller Foundation Grant supports fellowships in residence at the National Museum of African Art and the Center for Asian Art.

II. Office of Interdisciplinary Studies - Funds were raised to partially support the Office's participation in the "Constitutional Roots, Rights, and Responsibilities" symposium and the development of teaching materials based on this symposium. In October 1987, the first General Foods World Food Prize will be awarded at the Smithsonian in recognition of a selected individual's outstanding contributions to expanding and improving the quality, quantity, or availability of food throughout the world. The Office will present a colloquium on "Science, Ethics, and Food" the day of the award ceremony to heighten awareness of and interest in vital issues pertaining to the global food chain.

III. Office of Elementary and Secondary Education - Another OESE program for the District of Columbia Public Schools is "Exploring the Smithsonian," which served close to 5,000 young people in FY 1987. Supported in part by a grant from the Cafritz Foundation, this program provides bus transportation to bring junior high school students to the Smithsonian museums to take part in a selection of interdisciplinary lessons on curriculum-related subjects in art, history, and science. The OESE works with the various Smithsonian education offices to plan and maintain the program activities. This program will be suspended for FY 1988, while a committee (composed of museum and public school educators) redesigns the offerings to conform to the new junior high school curriculum.

MUSEUM SUPPORT CENTER

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	36	4,444	--	--	--	149	--	--	--	--
FY 1988 Estimate	36	4,475	--	--	--	59	--	--	--	--
FY 1989 Estimate	42	4,625	--	--	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Museum Support Center (MSC), located in Suitland, Maryland, adjacent to the Institution's Suitland Facility, provides a state-of-the-art facility for the care, conservation, and storage of the Institution's collections. The conservation facilities at the MSC include the Conservation Analytical Laboratory and conservation labs for the National Museum of Natural History/Museum of Man and the National Museum of American History. The collection storage area at the MSC occupies four discrete sections (or pods) and provides three types of storage space: "high-density" storage for collections stored in cabinets; "wet" storage for collections stored in alcohol; and "high-bay" storage for very large objects. The preparation and move of collections to the MSC from the National Museum of Natural History/Museum of Man and the National Museum of American History began in FY 1983 and is scheduled to continue through FY 1993.

For FY 1989, an amount of 42 workyears and \$4.625 million will permit the Institution to purchase collection storage cabinets and components (\$3.058 million); continue the preparation and transfer of collections to the MSC (\$448,000); provide ongoing administration and building management services at the MSC (36 workyears and \$969,000); and provide additional funding to evaluate the asbestos contamination level of museum objects prior to their move to the MSC (6 workyears and \$150,000). The continuation of this base of funding is essential for the planned development and use of the MSC as a major Institutional resource for the care and preservation of the National Collections and for the research programs based on these collections. The requested increase of 6 workyears and \$150,000 is necessary to fund the development of a standard method for testing museum objects contaminated with asbestos to determine if such objects pose any potential threat to human health prior to their move to the MSC.

PROGRAM - The Museum Support Center, located in Suitland, Maryland, provides a state-of-the-art facility for the storage of museum collections; the conservation and preservation of museum objects; and conservation training. The Conservation Analytical Laboratory, the Anthropology Conservation Laboratory of the Museum of

Natural History, and some of the facilities of the Division of Conservation in the Museum of American History are all located at the MSC. Conservation facilities occupy a significant portion of the laboratory wing, and their activities include conservation treatment, scientific analysis, and training. The Museum Support Center branch of the Smithsonian Institution Libraries system, one of five conservation libraries in the world and the only one in this country that provides a reference service on conservation, maintains a collection of more than 1,500 books and 60 periodical titles.

Collections storage facilities at the Museum Support Center are arranged in four discrete sections of the building, known as "pods." Approximately five-eighths of the total storage space (Pods 1 and 2, and a portion of Pod 4) will be occupied by collections stored in cabinets on three levels of concrete decks. In addition, one of the pods (Pod 3) has been reserved for the storage of "wet" collections (those stored in alcohol), and a portion of Pod 4 will be used for "high-bay" storage of very large objects.

The move of Smithsonian collections to the Museum Support Center is unprecedented in the museum community in terms of volume, characteristics and variety of the collections, and the distance involved. The National Museum of Natural History/Museum of Man alone is sending millions of objects and specimens to the MSC. The entire transfer of the collections is occurring over a multi-year period, with portions being moved only when appropriate storage equipment at the MSC has been installed.

Current Status of the Museum Support Center - The Museum Support Center has proven to offer a decided solution to the Institution's storage needs, yet has continued to be beset with problems. In summary, on the positive side, the great majority of the space in the laboratory wing has been put to use; many objects and specimens have been relocated; and more collections continue to be prepared for moving. On the negative side, the General Contractor for the construction of decks in the pods and the procurement of storage cabinetry has recently been terminated by the General Services Administration for unsatisfactory job progress. The lack of collection storage equipment has meant that certain collection-related laboratory and office functions have not yet been able to relocate and that the move of collections has been greatly limited and delayed. Until it is known whether or not Contractor's surety will participate in the reprocurement of the storage equipment, no forecast can be made of when these facilities will be available for use.

Meanwhile, occupancy of the laboratory wing and the establishment of the MSC administrative structure has taken place, and the services provided by these offices and laboratories are functioning well. The Conservation Analytical Laboratory (CAL), the Anthropology Conservation Laboratory, and a branch of the Museum of American History Conservation Laboratory, which occupy about half of the laboratory wing, continue their work. In addition, new programs and functions are becoming reality at the MSC. The MSC Administration efficiently provides users of the facility with a wide range of services. The Computer Center used for research and inventory control purposes and the multiple services provided by the facilities management unit are examples.

While relocation of collections to the MSC is largely a function of the availability of appropriate collection storage equipment, the problem cited above in the procurement of this storage equipment system has not proven to be insurmountable. The move into the "wet" collection storage equipment in Pod 3 was

completed in 1985 with over 260,000 specimen lots transported to the MSC in 200 van loads. Since that time, more than 45,500 additional specimen lots, which are a part of ongoing departmental activities, have been moved into Pod 3. Other collections have been received at MSC and placed in temporary locations until such time as permanent facilities become available. Over 190,500 archeological objects (representing 25 percent of those collections) and 17,500 ethnological objects from the Department of Anthropology; more than 3,814,000 insect specimens from the Department of Entomology; over 36,500 petrology and meteorite specimens from the Department of Mineral Sciences; and 91,000 specimens from the Department of Botany, including diatoms and algae, have been thus relocated. All of these collections have been carefully cleaned, inspected for pests and conservation problems, and properly stabilized. These relocated collections are stored under less crowded and better environmental conditions, and, as a result, have far greater potential for long-term preservation than collections stored in most other Smithsonian storage areas. As more collections are prepared, they will continue to be moved to temporary storage in the MSC and the Mall buildings until their permanent storage locations are ready.

While such progress is positive and encouraging, only a small fraction of the MSC's potential as a collection support facility can be realized without the availability of the storage system for Pods 1, 2 and 4. Meanwhile, collection management problems, which the MSC was created to rectify, continue for collections scheduled to move.

Museum Support Center Storage Equipment - Design work for a collection storage system for the MSC began in September 1980. In consultation with the General Services Administration (GSA), the Smithsonian's agent for procuring the Museum Support Center's Collection Storage Equipment System, and with the architectural/engineering team's material handling consultant, and on their recommendation, the Institution decided to use a storage system that utilized a number of standard components. The system was to be a self-supporting three-level storage structure capable of holding the various kinds of shelves, drawers and screens needed to keep the collections safe from dust and insects while making them accessible for research, study and exhibition. This design was a pioneer effort, since no other such system existed for museum purposes.

After intensive efforts by the Institution, GSA, the architectural/engineering firm and the Contractor, the Institution was advised late in 1984 that the requirements for enclosure (bug-free, airtight) for the collection storage equipment for Pods 1, 2 and 4 could not be met by the self-supporting system. Therefore, it was decided to switch to a more conventional collection storage system, consisting of pre-manufactured storage cabinets on three levels of concrete decks. This work began in the summer of 1985. Some modification of the existing pod floor slabs became necessary to properly distribute weight loads of the new system.

Since that time, this contract has continued to be beset with problems. The performance of the Contractor has been untimely and deficient. As a result, on July 15, 1987, the General Services Administration determined that the General Contractor's performance was unsatisfactory and issued a termination for default. GSA has contacted the Contractor's surety to ascertain whether it will agree to participate in the reprocurement of the storage equipment for Pods 1, 2 and 4. If it declines to participate, then GSA will proceed to reprocure this storage equipment and recover, if necessary, the excess reprocurement costs by appropriate

means. GSA is currently preparing a reprourement plan in the event that surety chooses not to participate.

Since the recovery of excess reprourement costs may take several years, and the Institution must transfer the total project cost to GSA prior to the contract award date, base funding requested in FY 1988 (\$3,058,000) will be devoted to the reprourement of the "high-density" storage equipment. As a result, the procurement of the "high-bay" storage equipment (\$1,750,000) will be postponed until FY 1989. This funding level is based on the estimated cost of this equipment in FY 1985 (\$1.54 million) and an allowance to compensate for the accumulated effects of inflation since that estimate was calculated. (Actual cost for the "high-bay" storage equipment may vary as the result of actual bids received at the time of procurement and the inflation rate in effect at the time of the bid for the city of the bidder.) Funding is also contained in this budget (\$1,308,000) to complete the purchase of shelves and drawers for the "high-density" storage equipment needed for the initial move. By the time the FY 1989 Congressional budget is prepared, a better estimate of this project should be available.

Between FY 1981 and FY 1987, funds totaling approximately \$21.9 million have been obligated to purchase and install the "wet" storage and the "high-density" storage equipment for Pods 1, 2 and 4. An amount of \$3.058 million is requested for MSC collection storage equipment in FY 1988. The FY 1989 request will continue the FY 1988 level of funding. It is currently estimated that additional funding totaling approximately \$17.6 million will be needed from FY 1990 through FY 1993 to make full utilization of all available storage space in the MSC. (Actual costs for the collection storage equipment to be procured from FY 1990 through FY 1993 may vary as the result of actual bids received at the time of procurement and the inflation rate in effect at the time of the bid for the city of the bidder.)

Funding for MSC Collection Storage Equipment
FY 1981 - FY 1989

	<u>(\$000's)</u>
FY 1981 Actual	2,051
FY 1982 Actual	3,325
FY 1983 Actual	3,469
FY 1984 Actual	3,090
FY 1985 Actual	3,505
FY 1986 Actual	3,363
FY 1987 Approp.	3,058
FY 1988 Request	3,058
FY 1989 Request	<u>3,058</u>
<u>Total</u>	27,977

Move of the Collections to the Museum Support Center - Beginning in FY 1983, a detailed plan for the coordination of each phase of the move was developed using the principles and techniques of the "Critical Path Method" (CPM). Information affecting the complex schedules has been automated and is continuously updated. Simultaneously, decisions were also made regarding the specific methods of packaging and modes of transport appropriate to the particular collections and objects

involved. Since FY 1983, temporary museum technicians have been preparing the collections to be moved, including cleaning and stabilizing objects; packing and moving them within the museums to staging areas and then to the MSC; and performing conservation treatment when needed.

Preparation of "dry" collections (to be stored in Pods 1, 2 and 4) continues with work being done on the collections of the Museum of American History and the following Departments of the Museum of Natural History: Anthropology, Entomology, Mineral Sciences, Vertebrate Zoology, Botany and Paleobiology. The move of these and other collections to their final storage locations was planned to begin in FY 1988 following the installation of storage equipment. Most of these moves were scheduled for calendar years 1989 through 1991, with the relocation of some collections continuing through calendar year 1992. The present reprocurement plan for the acquisition of the storage equipment has disrupted these move schedules and made the forecasting of new schedules impossible until such time as a new contract schedule becomes clear.

After the installation of the "high-bay" storage equipment, scheduled for FY 1989, the schedule currently projects that the move of "high-bay" collections (oversized objects such as whale skulls, rickshaws, weaving looms and totem poles) will begin in FY 1990 and continue for the next two years.

Between FY 1983 and FY 1987, funds totaling approximately \$2.4 million have been spent to prepare the collections for relocation, to move collections for which there is storage equipment, and to cover the salary costs of the temporary work force engaged in cleaning, packing and moving collections. An amount of \$448,000 is requested for the MSC move in FY 1988. The FY 1989 request will continue the FY 1988 level of funding. It is anticipated that future funding requirements for the move will total approximately \$2.5 million from FY 1990 through FY 1993.

Funding for the MSC Move
FY 1983 - FY 1989

(\$000's)

FY 1983 Actual	562
FY 1984 Actual	483
FY 1985 Actual	427
FY 1986 Actual	468
FY 1987 Approp.	431
FY 1988 Request	448
FY 1989 Request	<u>448</u>

<u>Total</u>	3,267
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Administration and Facility Management - With base funding of 36 workyears and \$969,000, the Office of the Director of the Museum Support Center is responsible for the administrative coordination of the activities of the various user and support units; of the automated data processing center used for registration and collections management activities, including the move to the MSC; and of the research and informational requirements of the occupants. The Office also enforces the procedures established to control and account for the flow of collections into

and out of the MSC and insures the safety of the collections against pest infections and other hazards. Under the general supervision of the MSC's Office of the Director, the facility manager is responsible for providing shipping and receiving services, moving equipment and objects, overseeing safety and security operations, and cleaning and maintaining all parts of the building. Because of the need to maintain very strict environmental standards for the care and storage of museum objects, cleanliness is a fundamental requirement in the successful operation of a collection management facility.

EXPLANATION OF PROGRAM INCREASE:

Evaluation of Asbestos Contamination (6 workyears and \$150,000) - For FY 1989, an amount of 6 workyears and \$150,000 is requested to develop a method for evaluating the asbestos contamination level of a museum object to determine its potential threat to human health.

In order to relocate collections to MSC that have been stored in an asbestos environment, the Institution must be able to state that these collections do not pose a human health threat at the time the move occurs. Approaches to develop a method to make this evaluation have been proposed by the Office of Environmental Management and Safety and need to be tested. Once a testing approach is agreed upon, it would be applied to potentially contaminated objects so they could be appropriately treated or freed for use. The implementation of this test study is vital so that the tens of thousands of objects over which this cloud of uncertainty hovers can be used for research or exhibition purposes.

Additional funding will be required for this study effort in FY 1990 and possibly FY 1991. The total amount required will be directly related to the degree of success achieved in FY 1989. The figures of \$647,000 for FY 1990 and \$46,000 for FY 1991 have been projected as a worst case scenario and hopefully can be drastically trimmed, depending on the success of efforts in FY 1989.

The requested increase of 6 workyears and \$150,000 for FY 1989 will allow the assembly of a team of safety specialists and technical support staff to carry out this badly needed project. Presently, neither the Office of Environmental Management and Safety nor the National Museums of Natural History and American History have the staff resources or funding required. Specifically, two safety specialists (2 workyears and \$54,000) will be hired in January 1989 to provide the professional safety expertise required to establish, manage, and evaluate this project. A team of temporary museum technicians (4 workyears and \$48,000) will be hired to assist the professional safety specialists with the actual execution of the work. A sum of \$34,000 has been earmarked for the extensive laboratory analysis work which will be required in this process. Lastly, two equal amounts of \$7,000 each have been set aside for the purchase of needed supplies and equipment.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - An allotment of \$750,000 was provided to purchase special laboratory equipment for the Conservation Analytical Laboratory. It is anticipated that the entire sum will have been expended by the end of FY 1988.

ADMINISTRATION

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	269	13,896	200	10,107	20	3,030	--	124	--	--
FY 1988 Estimate	296	15,885	203	13,198	20	2,353	--	185	--	--
FY 1989 Estimate	319	17,661	203	13,049	16	2,153	--	107	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - Administration includes central management, planning, oversight and review provided by the Offices of the Secretary, Under Secretary, Assistant Secretary for Administration, General Counsel and Treasurer. It also covers a wide range of specialized administrative and technical offices. Included among these are Audits and Investigations, Business Management, Congressional Liaison, Contracts, Equal Opportunity, Facilities Services (responsible for Design and Construction, Plant Services, Protection Services, Environmental Management and Safety Programs and Architectural History and Historic Preservation), Financial Management and Planning, Accounting and Financial Services and Risk Management. Other offices comprising this grouping include Information Resource Management, Management Analysis, Personnel Administration, Printing and Photographic Services, Programming and Budget, Special Events, Procurement and Property Management and Travel Services. These organization units receive both appropriated funds and nonappropriated unrestricted Trust funds for their operating support in approximate balance to the overall funding of the Institution. Some offices, however, such as Business Management, Contracts and Risk Management are funded entirely with trust funds reflecting the nature of their work. The funding for the Workers' Compensation account is also included here.

For FY 1989, an increase of 23 workyears and \$1,803,000 is requested for the following purposes. The Office of General Counsel requires \$40,000 to correct a base deficiency and 1 workyear and \$50,000 to provide for the addition of an attorney to assist with the ever-increasing demand for legal services. The Office of Audits and Investigations requires \$59,000 to correct a base shortage and \$30,000 on a one-time basis to implement an automated management system. The Office of Congressional Liaison requests 1 workyear and \$50,000 to strengthen the Institution's congressional liaison activities. The Office of Facilities Services requests an increase of 1 workyear and \$66,000 to provide support and coordination for development and implementation of automated programs for the Office of Director of Facilities Services and subordinate organizations. The Office of Architectural History and Historic Preservation requests 1 workyear and \$29,000 to provide

staffing for the research and documentation function of the Office. The Office of Financial Management and Planning requires 1 workyear and \$100,000 to fund an existing base deficiency and a further amount of \$400,000 to continue and complete the Institution's implementation of integrated financial management systems. The Office of Accounting and Financial Services requests 5 workyears and \$94,000 to correct staffing shortages in accounts payable, account reconciliations, account procedures and data entry. The Office of Information Resource Management requests 2 workyears and \$68,000 to support mainframe systems-software functions and an increase of \$200,000 is required to fully implement the Personnel Payroll System. The Office of Personnel Administration requests 4 workyears and \$126,000 to improve current personnel services and to maintain pace with the projected growth of employment. The Office of Procurement and Property Management requests 1 workyear and \$91,000 to strengthen the capabilities to manage automation requirements. Increases of 6 workyears and \$400,000 are sought for the Office of Environmental Management and Safety to continue a phased program to bring Smithsonian operations into compliance with laws and regulations aimed at protecting facilities, staff and visitors from safety and environmental hazards. These increases are offset by a decrease of \$70,000 associated with nonrecurring expenditures in FY 1988 for storage systems for the Hazardous Waste Program and for computer equipment.

Also included in this line item is an increase of \$43,000 for Workers' Compensation which is discussed in the Uncontrollable Increases section of this budget.

Funds totaling \$832,000 and 18 workyears are being requested for the Offices of Environmental and Safety (4 workyears and \$169,000), Procurement and Property Management (11 workyears and \$555,000), Personnel Administration (1 workyear and \$42,000), Accounting and Financial Services (1 workyear and \$20,000), and Audits and Investigations (1 workyear and \$46,000). These increases are discussed in the Restoration and Renovation section of this budget request and will provide for management and technical costs associated with the enhancement of the Smithsonian's Restoration and Renovation Program.

PROGRAM - Within this activity grouping, the Office of the Secretary, with the assistance of the Office of the Under Secretary, is responsible for management and administration including policy determination, program planning, legislation and the direction and review of performance of activities. The Office of the Assistant Secretary for Administration, including the Director of Facilities Services, is responsible for administrative and technical services and for facility planning, design, construction, operation and maintenance, protection, safety programs and for architectural history and historic preservation.

The Office of Audits and Investigations is responsible for performing all internal and external auditing and the investigation of any fraud, waste, abuse or white collar criminal activity. The internal audit function includes auditing Federal programs as well as Trust-funded activities on a recurring basis. The Office reports the results of audit findings and makes recommendations to aid management at all levels in program administration. The external audit function involves the audit of documentation in support of claims, cost proposals and cost and pricing data arising from contracts, grants and other financial agreements. The investigation function involves investigating acts of alleged criminal activities by employees or contractors, the results of which serve as the basis for appropriate criminal, civil or administrative remedies. Investigations also involve investigating programmatic and operational weaknesses susceptible to fraud and

abuse. The work of the Office is considered by the Smithsonian's public accountants in determining the nature, timing and extent of the public accountants' audit procedures. Reports on audits and investigations are provided to the Audit and Review Committee of the Board of Regents.

The Office of the General Counsel provides counseling to the Smithsonian Board of Regents, the Secretary and other executive and program officers on legal matters involved in Smithsonian administration; coordinates and oversees the conduct of litigation and other adversary proceedings to which the Institution is a party; reviews administrative claims arising out of Smithsonian operations and generally monitors all aspects of Smithsonian activities for legal implications vis-a-vis new developments in the law.

The Office of the Treasurer has responsibility for financial management. This includes the direction of financial planning, accounting, payroll, financial reporting, administration of grants, insurance and risk management, handling of bank relations, oversight of investments and management of certain auxiliary activities. Components of the Office of the Treasurer include: Financial Management and Planning, Accounting and Financial Services, Risk Management and various business management offices, including Museum Shops, Mail Order, Product Licensing and Concessions.

The Office of Congressional Liaison is responsible for the development and maintenance of the Institution's relationships with the Congress; the presentation of policies, programs and plans to the Congress; the preparation and clearance of legislative materials and the organization of Smithsonian participation at legislative hearings; and liaison with Federal agencies and organizations having related interests.

The Contracts Office handles sponsored research and other projects which are funded by state, federal, foreign and international governments. It prepares proposals for such projects and negotiates and administers any resulting grants or contracts. In addition, it handles certain specialized contracts (such as revenue-producing ones) related to Trust-funded operations.

The Office of Equal Opportunity plans, conducts and monitors a positive action program to provide equality in employment practices and program activities. Major efforts include an affirmative action program, program and facility access for disabled persons, employee counseling and complaint adjudication, upward mobility, programs for women and Hispanics and community outreach to minority and women's groups.

The Office of Information Resource Management oversees planning for new automated systems and technologies; helps determine information resource management policy; ensures the integrity and security of Institutional data; applies modern computer and communications technology in support of the Smithsonian's scientific, scholarly and management information activities; and ensures technical integration of hardware and software required to make information and computing power widely available to support users of information systems and computers. It acquires, develops and maintains high quality automated information processing and data communications systems; administers the Smithsonian's data processing cost center; operates computer systems and voice and data communications networks and provides a wide range of education and training services.

The Management Analysis Office provides staff assistance and advisory services in support of Smithsonian administrative operations. The Office performs studies of organizations, systems and procedures; prepares and distributes management issuances containing policy and instructions governing operations and conducts the Institution's forms management program.

The Office of Personnel Administration provides personnel services, advice and assistance to managers and employees of the Institution. Within the laws, rules and regulations of relevant controlling agencies and within the policies of the Institution, the Office is responsible for recruitment, staffing, position classification; wage and salary administration; performance management and merit pay systems; employee relations and benefits administration, planning, counseling, processing and communications. The Office also is responsible for labor-management relations; providing training and career development; employee assistance, job and retirement counseling; workers' compensation; unemployment insurance; personnel policy development; personnel management evaluation and records and data processing and maintenance.

The Office of Printing and Photographic Services is the central office for technical advice, guidance and production on photography and duplicating services to curatorial, scientific, technical and administrative staff. Photographic services include studio and on-site photography, photographic copy restoration, printing, preservation of originals under archival conditions, the development and maintenance of an automated catalogue of photographs, the investigation and application of new photographic technologies, and sales of materials to the public.

The Office of Programming and Budget formulates the consolidated Federal and nonappropriated Trust fund budgets for review and approval by the Secretary and the Board of Regents. Approved budgets are prepared for submission to the Office of Management and Budget and to the Congress, and the Office serves as liaison with OMB and Congress on budgetary matters. Appropriated budgets and nonappropriated Trust fund budgets are monitored to help assure that program needs are met, budgetary goals are achieved and that accountability is maintained. The Office prepares the Five-Year Prospectus, advises management on matters pertaining to program planning and development and incorporates financial information in central data bases for use in management reports, budgetary planning and special analyses.

The Office of Director of Facilities Services directs a wide range of programs essential to the security, operation, maintenance and repair of Smithsonian facilities and the modification and improvement of the physical plant to support growth of programs and activities. The Office is also responsible for long-range planning for facilities development and utilization, energy conservation, real property management and provision of facilities-related services. Reporting to the Director of Facilities Services, within the Administration grouping, are the Office of Environmental Management and Safety and the Office of Architectural History and Historic Preservation. The Office of Environmental Management and Safety is responsible for providing technical and professional services and support throughout the Institution for fire protection of its facilities and National Collections, occupational safety and health including industrial hygiene, hazardous materials control and diving safety; as well as the review, dissemination and implementation of requirements of all new fire safety, health and environmental laws, regulations and standards. The Office of Architectural History and Historic Preservation is responsible for the architectural history of the Smithsonian, historic preservation issues and the Smithsonian furnishings collection.

The Office of Special Events plans and arranges events associated with exhibition openings, seminars, lectures and other activities upon the request of bureaus and offices and outside groups when given the permission to use Smithsonian facilities. A monthly master calendar of special events is maintained.

The Office of Procurement and Property Management is responsible for the policy, planning and coordination of the procurement, contracting, property management and supply program for the Smithsonian Institution including its field operations. As the principal acquisition office for the Institution, it procures supplies, materials, contractual services and equipment for research, facility construction, renovation and repair, automated systems design and support including hardware and software and major auxiliary activity enterprises such as food services, as well as the Smithsonian's traditional curatorial and exhibits preparation activities. It also acts as the Institution's space leasing agent. As the central procurement management office for the Institution, it is responsible for the management, accountability and security of non-expendable property. It ensures this through maintenance of equipment records and by scheduling and overseeing inventories.

The Travel Services Office makes travel arrangements in the most economical and effective manner consistent with Smithsonian and Federal travel regulations. Information concerning changes in travel procedures and regulations is distributed to bureaus and offices. Requirements for the use of contract carriers and United States carriers for international travel are enforced. The Office works closely with other offices in the development and implementation of new and revised travel regulations.

Progress in Administrative and Technical Support - Major emphasis over the past year and continuing for the current and future budget years includes the operation of the administrative and support activities to assure their responsiveness to needs. Particularly noteworthy activities, developments and accomplishments during FY 1987 included the following:

The volume and content of the workload of the Office of General Counsel continue to be directly affected by new initiatives in Smithsonian programming as well as by developments in the law having an impact on the administration of the Institution and its diverse programs. Such has been the case with, for example, the opening of the International Center, the National Museum of African Art, and the Sackler Gallery in the Quadrangle, the expected sale of the Museum of African Art property on Capitol Hill, the construction of the new restaurant facility at the National Air and Space Museum, Indian materials repatriation issues, discussions concerning the relocation of the Museum of the American Indian, the establishment of a Smithsonian Day Care Center, the enactment of the Immigration Reform Act, the Tax Reform Act of 1986, the Clean Water Act Amendments, the Federal Employees' Retirement System Act of 1986, and the in-depth review of important policy issues such as drug testing, smoking restrictions, and sexual harassment.

The specific legislative accomplishments of the Office of Congressional Liaison include the reappointment of Smithsonian Regents and the authorization of funding to construct the Charles McC. Mathias Laboratory for Environmental Research at the Smithsonian Environmental Research Center (SERC) at Edgewater, Maryland. Measures providing for the repeal of the National Armed Forces Museum Advisory

Board, Cooper-Hewitt construction, and the disposition of Native American skeletal remains will be the focus of continuing legislative authority.

The Office of Programming and Budget conducted an assessment of the Institution's internal budget formulation procedures. As a result, activities of the Office were enlarged to include responsibility for preparation of the Five-Year Prospectus. This change will strengthen Institution-wide planning and coordination with the budget process. Additionally, the Office proposed and the Institution adopted new budget and planning procedures which are described earlier in this document and are aimed at increasing the efficiency and effectiveness of management decisions. These procedures also resulted in increased use of automation in the assembly of the budget and the Prospectus.

The Office of the Treasurer has continued to emphasize improvement of financial management and accounting systems. Improvement to the Smithsonian's payroll personnel system was a number one priority for FY 1987 and FY 1988. The Smithsonian will utilize the Department of Agriculture's National Finance Center to run both its Federal and Trust payrolls beginning November 1987. Also during FY 1987 a project was initiated to develop and implement a new financial system beginning with the general ledger function. This project is cognizant of and has as one of its goals consistency with the Office of Management and Budget's initiatives in this area. Included are emphases on the use of off-the-shelf software and standardization of the general ledger with government-wide efforts.

Under a research program in the Office of Printing and Photographic Services into applied photographic preservation, initial testing was completed and work published regarding a new toning solution whose use could eliminate a suspected carcinogen from laboratory use. In addition, the production of three video discs was completed with emphasis on railroad and other transportation subjects. Under investigation is the use of a newly developed still video system for potential important application to collections management and other projects. In the fall of 1987, the Office will mount its fourth annual exhibition, "History As Seen from the National Museum of American History." In addition, the Office's Smithsonian Institution Traveling Exhibition Service exhibition "The Vietnam Veterans Memorial: A National Experience" has been booked through mid-1989 and a second exhibition has been produced to meet demand. A related book on the Memorial, Reflections on the Wall, has entered a second printing.

During the Institution's fifth year of formal information resource management, the trends of modernization and distributed processing continued under the Office of Information Resource Management (OIRM). A major effort to survey and identify all Smithsonian data is paying off in improved design of new systems. The ongoing convergence of computer and communications technologies was responded to by the combination of the telephone management office of the Office of Plant Services with the OIRM's data communications office into a new OIRM division. The new division has begun strategic planning for integrated voice, data and image communications systems. Development of a new on-line collections information system continued under the general oversight of an Institution-wide committee. Choice of new accounting/budgeting/procurement software is expected by the end of FY 1987. The transfer of personnel and payroll functions to the National Finance Center is on schedule, to begin with FY 1988. Several general-purpose applications were developed on the new mainframe computer, including a system to provide bureaus with access to their accounting, personnel, and payroll data on-line. Tools for scientific and research data analysis and presentation are being installed on the

mainframe also. Increasing emphasis was given to training of Smithsonian staff, to make more useful the growing number of microcomputers and the new mainframe applications; about 1,000 staff were trained in FY 1987. A survey of OIRM publications will improve the communication of essential information to Smithsonian staff about new systems and programs.

The Office of Procurement and Property Management (renamed from Office of Supply Services to indicate more adequately its scope of responsibilities) completed the purchasing and delivering of all furnishings and related equipment for the Quadrangle. The close-down of the Smithsonian Environmental Research Center (Rockville) was completed successfully with the reutilization or sale of equipment and the sublease of the space. Major contracts negotiated included those for food service operations, the new restaurant at the Air and Space Museum, the Tupper Laboratory and Conference Center in Panama, the Personnel Payroll System with the National Finance Center and the acquisition of computer systems and equipment.

Particular activity in the Office of Personnel Administration included substantial revisions to the orientation program for new employees to provide a more welcoming, educational and efficient introduction to the Institution and to various specific benefits and other personnel matters. The Office performed very effective work in providing accurate data to the National Finance Center on Smithsonian civil service and trust employees for conversion to its personnel/payroll system. Implementation, including a substantial effort to inform and educate employees, of the Federal Employees Retirement System and its Thrift Savings Plan and the Immigration Reform and Control Act proceeded smoothly.

Further information on management improvement activities is contained in the Introduction to this budget.

EXPLANATION OF PROGRAM INCREASES:

For FY 1989, an increase of 23 workyears and \$1,803,000 is requested for the following purposes. The Office of General Counsel requires \$40,000 to correct a base deficiency and 1 workyear and \$50,000 to provide for the addition of an attorney to assist with the ever-increasing demand for legal services. The Office of Audits and Investigations requires \$59,000 to correct a base shortage and \$30,000 on a one-time basis to implement an automated management system. The Office of Congressional Liaison requests 1 workyear and \$50,000 to strengthen the Institution's congressional liaison activities. The Office of Facilities Services requests an increase of 1 workyear and \$66,000 to provide support and coordination for development and implementation of automated programs for the Office of Director of Facilities Services and subordinate organizations. The Office of Architectural History and Historic Preservation requests 1 workyear and \$29,000 to provide staffing for the research and documentation function of the Office. The Office of Financial Management and Planning requires 1 workyear and \$100,000 to fund an existing base deficiency for Director of Financial Planning; and \$400,000 to continue and complete the Institution's implementation of integrated financial management systems. The Office of Accounting and Financial Services requests 5 workyears and \$94,000 to correct staffing shortages in accounts payable, account reconciliations, account procedures and data entry. The Office of Information Resource Management requests 2 workyears and \$68,000 to support mainframe systems-software functions and an increase of \$200,000 is required to fully implement the Personnel Payroll System. The Office of Personnel Administration requests 4 workyears and \$126,000 to improve current personnel services and to maintain pace

with the projected growth of employment. The Office of Procurement and Property Management requests 1 workyear and \$91,000 to strengthen the capabilities to manage automation requirements. The Office of Environmental Management and Safety requires 6 workyears and \$400,000 to continue a phased program to bring Smithsonian operations into compliance with laws and regulations aimed at protecting facilities, staff and visitors from safety and environmental hazards. These increases are offset by a decrease of \$70,000 associated with nonrecurring expenditures in FY 1988 for storage systems for the Hazardous Waste Program and for computer equipment.

Office of the General Counsel (1 workyear and \$90,000) - Taking into consideration the various legal suits, tort and personal property claims; bequests; contract agreements, disputes, and protests; standard of conduct (Ethics Counselor) matters; personnel complaints; intellectual property right issues; and collection management matters, the Office of the General Counsel has an ongoing workload of approximately 600 matters at any one time, and the number continues to grow. For example, between FY 1985 and FY 1986 there was a 182 percent increase in the number of collection management matters on which legal counseling was necessary, perhaps reflecting the heightened awareness throughout the Institution of the legal issues inherent in formulating and administering sound collection management policies. Similar increases were experienced in estate matters (72 percent) and contracts and agreements (26 percent), as well. While a final analysis of the workload in FY 1987 is not yet available, the broadened base of activities requiring legal oversight has caused a noticeable increase in the workload of the Office of the General Counsel.

For FY 1989 an increase of \$40,000 is requested to correct the base deficiency in the federal budget of the Office of the General Counsel. Since FY 1986, there has been a deficiency in the base federal allotment to the office, although no increase in program operations has been implemented. As a result, to avoid the furloughing of staff or a reduction in force (which would cause a major disruption in services provided to the Smithsonian as a whole), the office has been required to seek a reprogramming of funds to cover the deficit each year. Owing to the personnel intensity of the office, there is no flexibility to defer or shift expenditures to eliminate the deficiency. Unless a permanent increase in the federal budget is made, the base deficiency will carry forward to successive fiscal years, and will be increased with each general pay raise, inflation adjustment, etc., that must be absorbed. To eliminate the necessity of a reprogramming exercise each fiscal year, when no program enhancement has been proposed, and to avoid the operational uncertainty that the threat of a furlough or a reduction in force imposes, an increase of \$40,000 is sought in FY 1989 as a permanent addition.

In addition; an increase of 1 workyear and \$50,000 is requested for the addition of an attorney to the staff. The ever-increasing demand for legal counseling noted above has created a need for additional personnel resources to meet that demand.

Office of Audits and Investigations (\$89,000) - Funds in the amount of \$59,000 are sought to correct a long-standing base shortage for existing staff. In addition, \$30,000 is sought on a one-time basis for the purchase of local area network computer equipment. This will enhance the Office's basic function of providing management with opinions on the efficiency, economy and effectiveness of Smithsonian programs and functions. It also will provide the tool to be able to detect fraud, waste and abuse more methodically. In addition, the network will

streamline the current administrative procedures to allow more time for audits and investigations. In future years, as other Smithsonian bureaus network their computer to the main network, the Office of Audits and Investigations will be able to more easily access and analyze their data and perform more detailed analyses of larger amounts of data than is currently available.

Office of Congressional Liaison (1 workyear and \$50,000) - An increase of \$50,000 is requested for the hiring of a permanent senior staff member to strengthen the Institution's congressional liaison activities. The increasing emphasis of Congress on close scrutiny of legislative agenda requires the effective defense of proposed programs and their funding. The goal of the Office of Congressional Liaison is to improve the Institution's communication with members of Congress and congressional staffs by expanding personal contacts and increasing the availability of congressional liaison staff to the congressional audience. This increase in the scope and frequency of personal contacts will enable the liaison staff to define and discuss Smithsonian-related issues as they proceed through Congress.

Office of Facilities Services (1 workyear and \$66,000) - The requested increase of \$66,000 will provide support and coordination for development, implementation and management of automated programs for the Office of Director of Facilities Services and subordinate organizations. The oversight function of the Office involves extensive administrative requirements for review, tracking and reporting on project and financial status and coordination of activities between the five facilities services organizations: the Offices of Design and Construction, Protection Services, Plant Services, Environmental Management and Safety and Architectural History and Historic Preservation. Together these offices are responsible for the operation, maintenance and repair of the Smithsonian's physical plant, the security of property and the National Collections, and safety of staff and visitors. The ability to share information on a timely and continual basis is vital to the success of these facilities programs and the many major projects that require coordination between the individual organizations. Access to the networks within the organizations will greatly improve the effectiveness and efficiency of management of the facilities programs and activities. A system administrator (1 workyear and \$50,000) is requested to oversee establishment and management of interactive systems to maintain the essential exchange of information on facilities activities. Support costs in the amount of \$16,000 for automation equipment, software development and supplies are also requested.

Office of Architectural History and Historic Preservation (1 workyear and \$29,000) - A new position is sought to provide staffing for the research and documentation function of this Office. The historic buildings of the Smithsonian are among its most valuable collections. The Office of Architectural History and Historic Preservation is responsible for advising on the most appropriate way to preserve these landmarks for future generations. To do this, detailed information on the architectural history of each building, such as materials used, structure, systems and changes over time must be available before decisions are made about restoration, repair or renovation. In addition, there is substantial interest among scholars and the public regarding the history of the monumental structures that house the Institution's collections. It is important that the Institution have available information that will aid in understanding the history of the design, construction and use of the buildings. Present staff is inadequate to fulfill this function. For FY 1989 an architectural historian (1 workyear and \$29,000) is requested to perform the necessary research, organize the photographic

and documentary archives and assist students, scholars, visitors and Smithsonian staff in using the information.

Office of Financial Management and Planning (1 workyear and \$500,000) - For FY 1989 an increase of 1 workyear and \$100,000 is requested to fund an existing base deficiency for director for financial planning. This position supervises the Financial Systems Development Division, which has the responsibility for implementation of new financial systems for the Institution. The balance of \$400,000 is requested to continue and complete the Institution's implementation of integrated financial management systems. Beginning in FY 1985, and in concert with directives from the Office of Management and Budget, the Department of the Treasury, and the General Accounting Office, the Smithsonian began a carefully planned program of financial systems replacement that consisted of three stages. Since the predominant investment, with a relatively short timetable, has been made with non-appropriated Trust funds, and given the Institution's combination of Federal and non-Federal funds, it is logical that appropriated funds contribute towards the completion of the implementation as advocated by the Joint Financial Management Improvement Program's Small Agency Financial Standardization Initiative.

Office of Accounting and Financial Services (5 workyears and \$94,000) - An increase of 5 workyears and \$94,000 is sought to correct staffing shortages that exist in accounts payable, account reconciliations, accounting procedures and data entry. The shortages evolved over the past three years and are due to substantial increases in the volume of financial transactions and activities which are a result of Institution-wide growth. From FY 1984 to FY 1986, the volume of financial transactions increased by 10 percent. Total Federal expenditures increased by \$23 million or 13 percent and are expected to grow another 10-15 percent by FY 1989 with the opening of the Museum of African Art and the Sackler Gallery on September 28, 1987. To maintain bill paying in a timely fashion and control standards, 2 workyears and \$35,000 are needed for the accounts payable program. To ensure that internal controls are appropriate and efficient, an increase of 2 workyears and \$40,000 is needed for account reconciliations and documentation of accounting procedures. An increase of 1 workyear and \$19,000 is needed to maintain acceptable production schedules for entry of data into the accounting system.

Office of Information Resource Management (2 workyears and \$68,000) - For FY 1989 an increase of 2 workyears and \$68,000 is requested to perform mainframe systems-software duties to support all areas of Institutional endeavor. Systems software consists of the computer operating system, data base management systems, general-purpose utilities, diagnostic programs, and other "behind-the-scenes" programs. The new mainframe computer is supported by only two staff in this area, who are not interchangeable: one to maintain and manage upgrades to the operating system and the other to install, tune, and troubleshoot new applications. An example of their contribution in FY 1987 was the modification of an inexpensive software package to provide Smithsonian-wide electronic mail at low cost. The increase of 2 workyears would provide backup to these two positions, increasingly essential to provide reliable computing as the use of the mainframe grows, both in number of applications and in number of users.

Personnel Payroll System (\$200,000) - The Institution has entered into an agreement with the United States Department of Agriculture's National Finance Center (NFC) for computer services in support of personnel management and payroll production. The implementation of the NFC's personnel and payroll modules will replace all existing systems now run by the Smithsonian on the Honeywell and

Nixdorf computers. The Institution's implementation of a new Payroll Personnel System (PPS) consists of four phases. Phase I will replace the payroll function and develop interface programs to simulate satellite systems for processing of payroll data related reports. Phase II will replace these satellite systems with improved functions developed for the IBM mainframe computer. Phases III and IV are the planning and implementation stages, respectively, which will allow all bureaus and offices access to the PPS. The total estimated cost is \$1,290,000 for the development and implementation of the new Payroll Personnel System. With approximately \$890,000 of the Institution's Trust funds, Phase I will be operational in November 1987. Phase II is estimated at \$200,000, Phase III at \$100,000 and Phase IV at \$100,000. Institutional Trust funds should not be expected to bear all the costs of this system development, since three-quarters of the staff is Federal. Therefore, in FY 1989, \$200,000 is sought to implement Phases III and IV, to provide access to the data from all bureaus and offices. This access will allow each administrative officer to study and analyze positions and staffing, to modify staff data, and to check status of personnel actions. The Smithsonian's Office of Personnel Administration will continue to be responsible for any modifications and verification of official data.

Office of Personnel Administration (4 workyears and \$126,000) - An increase of 4 workyears and \$126,000 is requested to improve current personnel services to the Institution and to keep pace with the projected growth of Institution employment. For FY 1989, the Institution is requesting an increase of 158.5 work years in the Salaries and Expenses Appropriation and 38 workyears in the Restoration and Renovation Appropriation. To service this added population, the personnel office will require two additional staff members. The other two additional staff members are to reduce slightly the overall ratio of personnel staff to population serviced. The current Office of Personnel Administration personnel ratio is 1:101. The range in the Federal Government runs from 1:31 to 1:111. Only one Federal agency's ratio exceeds the Smithsonian's.

Office of Procurement and Property Management (1 workyear and \$91,000) - An increase of \$91,000 is sought to strengthen the Office's capability to manage automation acquisitions, to automate its own operations and to provide supplies and services required by the Institution. The addition of a senior automation contract specialist (1 workyear and \$59,000) would provide the resources necessary to ensure effective and timely contracting in this growth area. With automation supporting practically every Institutional endeavor, acquiring this position will provide the long-needed contracting expertise which can be devoted primarily to this effort. A further \$12,000 is sought to purchase ADP equipment to effect the planned automation of the Office, to increase productivity, track the flow of documentation, complete and issue reports, maintain inventory records and control the budget. A new, more flexible and responsive, property management system is planned to allow on-line data entry and retrieval and thus provide for greater utilization of this property by those in need. The balance of this request (\$20,000) will provide for staff training in products, services and procurement techniques; supplies and materials to stock central distribution facilities with common-use materials for use by Smithsonian staff; repairs to office machines in use in the Institution which increasingly include automation equipment, and travel for the purposes of contract negotiations and administration.

Office of Environmental Management and Safety (6 workyears and \$400,000) - An amount of \$400,000 and 6 workyears is requested to continue a phased program to bring Smithsonian operations into compliance with laws and regulations aimed at

protecting facilities, staff and visitors from safety and environmental hazards. These resources, as described below, will be used for environmental protection and occupational health, hazard communication, radiation protection, environmental compliance, fire protection and safety training.

-- Environmental Protection and Occupational Health Program (1 workyear and \$65,000) - This requested increase will provide the resources necessary to hire a senior-level supervisory environmental engineer who will have the training and breadth of experience necessary to manage the Smithsonian's Environmental Protection and Occupational Health programs. Both of these areas have been dramatically affected by regulatory activity in the last few years. In an effort to bring the Institution into compliance with these regulations as effectively and expeditiously as possible, some existing resources have been specifically concentrated in a newly created Environmental Management Division. Without the requested new position these programs will continue to be operated in a fragmented and ineffective manner and without the assurance of compliance with applicable statutes and regulations within reasonable time periods.

-- Hazard Communication Program (1 workyear and \$164,000) - In FY 1988, \$60,000 has been requested for the Hazard Communication Program to begin to meet the legal requirements for such efforts as imposed by the Occupational Safety and Health Administration (OSHA) in 1986. It is estimated that the Smithsonian has some 100,000 such items for inventory and appropriate employees will require training in the use of these substances. The resources being sought for FY 1989 will permit the implementation of phase two of the program which would allow the hiring of a second safety specialist/industrial hygienist, provide contract funds for the development of a comprehensive employee training program, and cover the cost of a computerized data base of chemical inventories within the Smithsonian. This requested new position, along with the one provided in FY 1988, will allow the Smithsonian to begin to cope with the tremendous workload imposed by the OSHA regulations. Importantly, the requested position will permit the Smithsonian to comply with the more recent Hazard Communication Standard (29 CFR Part 1910.1200) which encourages federal agencies to designate this standard as a voluntary supplementary safety and health standard in fulfilling their responsibility for providing a safe and healthful work environment for its employees and volunteers.

-- Radiation Protection Program (1 workyear and \$52,000) - This requested increase is designed to implement the first phase of a three-phase Radiation Protection Program. The first phase of the program will involve the hiring of a health physicist who is specially trained in the highly technical field of radiation protection, procuring the instrumentation necessary to evaluate radiation exposures, and the placing of a laboratory analysis contract to examine samples for radiation contamination. Beginning in FY 1989, the first phase will involve the survey, by the health physicist, of all Smithsonian facilities where radioactive artifacts, radioisotopes used in research and x-ray machines are located. A comprehensive inventory of all radiation sources in the Institution will be compiled along with storage, use and disposal information concerning the status of Nuclear Regulatory Commission (NRC) licenses, and other legal requirements of applicable federal, state and local regulations. The second phase of the program, to be initiated in FY 1990, will include the development of radiation protection training programs within the Smithsonian, with actual presentation of the training, phase three, to take place in FY 1991. Should funds not be made available as requested for implementation of the Radiation Protection Program, the Smithsonian would be unable to comply with the requirements of 10 CRF 20 and, upon NRC

inspection and issuance of notice of noncompliance, would be subject to fines, revocation of licenses and other enforcement measures. The potential for adverse publicity and unnecessary radiation exposure to employees and visitors requires that the Radiation Protection Program be implemented as quickly as possible.

-- Environmental Compliance (1 workyear and \$35,000) - A high priority requirement of the Office of Environmental Management and Safety (OEMS) is to begin a comprehensive environmental compliance program. The resources requested in FY 1989 to initiate this effort allow OEMS to hire an environmental specialist who would be responsible for first-phase coordinative activities which will primarily involve the initial review of Smithsonian facilities and the writing of technical specifications which will form the basis for full environmental audits to be conducted through contract with outside firms, using Federal funds to be sought for 1990. This audit will encompass a systematic and objective review of all Smithsonian facilities by evaluating policies and practices and recommending corrective actions to meet environmental requirements. The contracted phases of the audit will be accomplished over several years. Compliance status will be determined for each facility or operation and will include an analysis of compliance with state and local regulations as well as federal environmental statutes. Without the knowledge of how each environmental statute applies to Smithsonian operations and buildings, the effective establishment and implementation of an Environmental Management Division will be virtually impossible.

-- Fire Protection Engineer (1 workyear and \$42,000) - The requested increase will permit the hiring of a fire protection engineer necessary to meet the Institution's statutory requirement to ensure full compliance with OSHA regulations (which include many requirements for protection of staff from fire). The services to be provided by the FY 1988 requested fire protection engineer position as well as this requested position will include the review and approval of all construction, renovation and exhibit plans to ensure compliance with applicable codes and regulations; performance of fire protection systems acceptance tests; annual facility surveys; evaluations of hazardous operations; and assistance in the preparation of Fire Protection Master Plans.

-- Safety Training Program (1 workyear and \$42,000) - This budget request is designed to establish a safety training program to bring the Smithsonian into compliance with the requirements of 29 CFR 1910, 29 CFR 1926 and 29 CFR 1960. Each of these Occupational Safety and Health Regulations is composed of dozens of standards, many of which require the training of employees in particular subjects. For example, the standard which regulates employee exposure to asbestos, requires that all employees potentially exposed to asbestos be trained, annually, in the health hazards associated with this carcinogen. This same type of training is required for employees exposed to other carcinogens, noise and any number of specific chemicals. In addition, 29 CFR 1960 requires that all managers and supervisors receive 16 hours of safety training and that safety committee members be trained to inspect facilities for safety hazards. It is estimated that training programs will have to be presented to 700 managers and supervisors, 150 safety committee members, 700 employees in the hearing conservation program and 300 employees potentially exposed to asbestos. There are numerous other groups of employees requiring other safety and health training, as well.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Funding of these centralized services from both appropriated and nonappropriated sources produces a ratio of Federal and Trust fund administrative support approximately in proportion to the programmatic salaries expenditures of the entire Institution. The amounts shown under Unrestricted General represent administrative expenditures for those units that are organizationally under Administration. Certain other units receiving administrative allotments are reflected in the appropriate section of the budget request. For example, administrative costs for the Smithsonian Astrophysical Observatory are reflected within its nonappropriated Trust funds section. Also included are expenditures for producing, distributing and marketing photographic material and slide sets, and funds to help defray the costs of the Office of Printing and Photographic Services. A program allotment is made to the Office of Equal Opportunity to support community outreach through exhibits and publications, specifically aimed at women and minorities. Funds also are provided for the costs of the identification and implementation of new financial and administrative management systems. Special Purpose funds include gifts received through unrestricted bequests which in accordance with the Bylaws of the Board of Regents subsequently are transferred to endowment. Anticipated expenditures in the Special Purpose category include support of studies in ornithology, computer conversion costs, a computer cost center and small amounts used for legal seminars, and research.

Restricted Funds - Included in this category are endowment bequests and foundation grants for scientific research publications and general research projects.

OFFICE OF DESIGN AND CONSTRUCTION

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	35	2,134	9	389	--	76	--	--	--	--
FY 1988 Estimate	35	2,261	9	468	--	50	--	--	--	--
FY 1989 Estimate	35	2,186	9	447	--	--	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Design and Construction (ODC) provides professional architectural and engineering services to the Institution in support of the development, operation, maintenance, repair, and improvement of the physical plant. Services include short- and long-range planning feasibility analyses, design and engineering studies, design development, contract document preparation, project management, contract administration, and development of cost and budgetary estimates. Other services provided by ODC include contract review, construction field office operations, interior design and space planning, and technical consulting support. The FY 1989 Salaries and Expenses estimate reflects a decrease of \$75,000 associated with nonrecurring expenditures in the FY 1988 base for the purchase of equipment and software for the automation of an information management and production scheduling system.

Funds totaling \$1,133,000 and 20 workyears are being requested in the Restoration and Renovation section of this budget request for management and technical costs associated with the enhancement of the Smithsonian's Restoration and Renovation Program.

PROGRAM - The primary functions of the Office of Design and Construction are to provide planning, engineering, architectural, and related administrative services for all construction, renovation, and repair projects for the Smithsonian facilities. The facilities are located primarily in the Washington metropolitan area, as well as the Smithsonian Environmental Research Center near Edgewater, Maryland; the Whipple Observatory in Arizona; the Cooper-Hewitt Museum in New York; the Astrophysical Observatory in Massachusetts; and the Tropical Research Institute in Panama. ODC's staff includes electrical, mechanical, structural, and civil engineers, architects and construction managers, computer specialists, planners, estimators, technicians, and administrative support personnel.

The major responsibility of the Office is to administer the Restoration and Renovation (R&R) and construction programs by providing professional and technical

support that addresses the facilities needs of the Institution in a cost-effective manner. The R&R Program is designed to preserve and rehabilitate an aging physical plant, correct code violations and provide a safe habitat for visitors and staff, and to provide proper environmental conditions for the preservation and maintenance of the National Collections.

Staff services provided by the Office include the preparation of contract documents (designs, specifications, and estimates) for construction services, master facility plans and analyses, and related budget justifications for requested R&R and Construction Programs. In FY 1987, ODC provided services in support of an estimated \$40,000,000 in various facilities, including exhibition projects. These funds were committed during the fiscal year and derived from Construction and R&R appropriations, Salaries and Expense appropriations and Trust funds. Some of the major projects for which funds were committed included the final phase of the Arts and Industries exterior renovation, the Freer Gallery alterations and Quadrangle connection, the Air and Space Museum Terrace Restaurant, the Tupper Laboratory and Conference Center, the Mathias Laboratory and Greenhouse, exterior repairs and roof replacement at the Museum of American History, and replacement of PCB transformers at various locations. In addition to current year activity, ODC planners and design staff professionals prepared preliminary facility requirement data and plans for future year projects estimated at \$150,000,000 in construction costs, comprised of the American Indian Museum, Dulles Facility for the Air and Space Museum, Suitland Facility Master Plan, Whipple Observatory Base Camp Facility, the Hirshhorn Museum and Sculpture Garden Space program, and the Tropical Research Institute Master Facility program.

During FY 1987, 116 construction services and 39 architectural and engineering services contracts were administered by the ODC staff. In addition, 80 exhibit installation projects were reviewed and 33 interior design and space related projects were supervised.

Also, expertise is provided to Smithsonian managers on matters relating to planned construction and facility development and utilization. To support these aggregate functions, ODC maintains numerous files of documents, cost data, plans, technical specifications, and drawings of past and current facility projects and programs for all of the Institution's buildings and sites.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These funds are provided by an allotment used to cover salaries and partial support costs as ODC provides services for both Trust and Federally funded programs.

OFFICE OF PROTECTION SERVICES

(Dollars in Thousands)

Fiscal Year	APPLICATION OF FUNDS									
	FEDERAL		UNRESTRICTED FUNDS				RESTRICTED		GOV'T GRANTS	
	FUNDS		General		Special		FUNDS		& CONTRACTS	
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	711	18,556	--	227	1	88	--	--	--	--
FY 1988 Estimate	735	19,419	--	8	1	93	--	--	--	--
FY 1989 Estimate	765	20,150	--	8	1	94	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Protection Services (OPS) protects the visitors, staff, collections, and facilities of the Smithsonian Institution (SI) by providing guards, physical security, and medical services. The authority of OPS to provide these services is derived from Public Law 82-206 and Public Law 88-391, which relate to the policing of Smithsonian buildings and grounds, and from Public Law 91-616, which relates to employee health.

For FY 1989, a total of 30 workyears and \$731,000 is requested to provide additional security personnel, as a result of the restructuring of the exhibits galleries and garden area of the Quadrangle (10 workyears and \$221,000); and to provide security coverage at the newly acquired General Post Office Building (20 workyears and \$510,000).

PROGRAM - The Office of Protection Services is a support organization responsible for protecting the collections, facilities, and other property of the Smithsonian from damage, destruction, or loss from any cause; protecting staff and visitors from personal injury; and creating and maintaining a secure environment for visitors and staff. Included within this broad mission is a responsibility for determining the protection requirements of Smithsonian facilities and meeting these requirements by operating a guard force; procuring, installing, and maintaining an alarms network and responding to its signals; installing and maintaining locks and other security hardware in Smithsonian facilities; planning and providing health services for employees and taking appropriate action to eliminate health hazards from the workplace; and providing emergency medical treatment for the injuries and sudden illnesses of visitors and staff.

OPS provides security management, guarding, investigative, and occupational medicine services to the Cooper-Hewitt Museum in New York City and to the major Smithsonian facilities in Washington, D.C., including 13 museums and art galleries, and provides technical assistance and advisory services in security matters to all Smithsonian bureaus. To accomplish its mission, OPS employs a large force of

security officers and a staff of administrators, training specialists, alarm systems specialists and technicians, investigators, museum security specialists, a medical officer, nurses, and emergency medical technicians.

The security force operates 24 hours-a-day, every day of the year, to patrol and provide access control at the Cooper-Hewitt Museum and at major facilities in or near Washington, D.C. Uniformed guards, plainclothes officers, and K-9 officers are stationed at entrances and patrol galleries inside and grounds around Smithsonian buildings day and night. They respond to emergencies; operate and respond to the signals of an alarms network that covers all SI facilities including the National Zoological Park, and the Smithsonian Mail Order Center in Springfield, Virginia; conduct security and fire patrols after the museum buildings are closed to the public; investigate accidents; report fire and safety hazards and malfunctions associated with mechanical and electrical equipment; escort valuable art shipments; and provide information to museum visitors. Protection arrangements, especially those related to dignitaries' visits and exhibitions of international interest, must be coordinated with and supported by the State Department, the Secret Service, the U.S. Park Police, and other Federal and local agencies. For the past several years, OPS has concentrated on reducing the number of thefts committed in SI facilities by posting plainclothes officers in areas of high crime rate, by providing intensified training in police methods and security practices for its officers, and by thoroughly investigating incidents.

The training of museum security officers is a specialized area in which OPS takes pride and which has gained renown in the museum community. Training staff instructs all new guards (including K-9), prepares guards for higher level officer positions, and conducts refresher courses for the force. Over the past several years, the staff has trained K-9 teams from Fairfax and Loudoun Counties and Falls Church, Virginia; Kanawa County, West Virginia, and the Annapolis, Maryland, Police Department, as well as guards and guard supervisors from Detroit Institute of Art, Museum of New Mexico, Virginia Museum of Fine Arts, U. S. Air Force Museum, Amon Carter Museum of Art of Fort Worth, High Museum of Art in Atlanta, National Aquarium of Baltimore, Bishop Museum of Hawaii, as well as others across the United States. OPS assists the Institution's Office of Museum Programs in providing training in security for small museums across the United States. Every year OPS hosts a large museum security conference that has become international in attendance. And for the past several years, OPS has played a leading role in worldwide efforts to improve security of cultural objects.

An expansive network of locks, alarms, and other devices is necessary to control access to and to protect SI facilities and property. OPS advises curators and exhibitors on appropriate security systems, as well as, plans, designs, acquires, installs and maintains security systems in SI facilities in the Washington metropolitan area. In addition, OPS provides advice on security systems for facility, exhibit and collection protection to Smithsonian organizations outside Washington and to museums, libraries, churches, historic sites and corporations.

OPS has been developing the Smithsonian Institution Proprietary Security System (SIPSS) to provide complete internal control of the equipment used in and the information provided by its security systems, to improve the timeliness of OPS response to the signals received through its alarm installations, and to control the costs associated with operating a security system. Installation of the first phase of the SIPSS at the Museum Support Center in Suitland, Maryland, and at the

Central Control Room on the Mall has been completed. The system now has been expanded to all Washington-area facilities. Over the next several years all of the old security systems will be converted to the SIPSS.

OPS conducts or arranges for security management surveys to determine protection requirements of Smithsonian facilities, investigates alleged and actual violations of the law occurring on Smithsonian premises, and escorts many shipments of valuable objects to and from the Smithsonian. The investigative program is designed to resolve collection losses, thefts, and other serious internal matters. Similar investigative assignments impacting on the retail operations of the Smithsonian Institution are also referred for advice and investigative attention. Successful resolution of collection losses and thefts requires coordination with the United States Attorney, the Department of Justice, and the court system.

OPS provides occupational medicine services and counseling for Smithsonian employees. The medical officer, occupational health nurses, and emergency medical technicians assist in identifying and eliminating hazardous work environments, monitor the health of employees exposed to occupational hazards, and provide first aid for on-the-job injuries of employees. Major program elements include general protection and monitoring of employees who are exposed to various specific hazards such as asbestos, loud noise, pesticides and other toxic chemicals; medical evaluation of individuals selected for certain hazardous jobs or for certain job duties or functions such as underwater diving (97), operating motor vehicles (19); employee assistance counseling to deal with substance abuse and emotional problems; routine medical treatments such as allergy shots (1,126), flu shots (647), and dressing changes, prescribed by an employee's private physician to reduce the amount of time employees must spend away from the workplace for simple health care; required immunizations for SI employees on official travel orders (362); health education and major disease screening programs and CPR (263); and first aid training for employees (127) including special first aid training for scientific expedition members (26) traveling in medically remote areas. OPS provides occupational medicine services at the Washington-area facilities and at other major remote facilities.

The occupational medicine program has been expanding rapidly since April 1983, when OPS appointed its first full-time medical officer. Occupational health units are operated in National Museum of American History, National Museum of Natural History, National Air and Space Museum, National Zoological Park, Museum Support Center, and Hirshhorn Museum and Sculpture Garden. Health services are available to employees in other facilities during regular visits by members of the health staff. OPS has acquired new equipment and developed a new examination program for the increasing number of employees identified as being at risk from exposure to asbestos and other toxic substances. Audiometric examinations (538) were given to employees for whom a hearing conservation program is required. Hearing protection devices were also provided. OPS will continue to develop the occupational health programs it is already operating and will undertake additional required programs when the additional space needed to administer these programs is provided. The programs expected to grow most rapidly are employee assistance counseling, monitoring of toxic chemical exposed employees, diabetes screening, glaucoma testing, cholesterol testing, and preemployment physicals. There is also a need to promote voluntary screening programs more heavily, to increase employee participation and to conduct these programs at the Cooper-Hewitt Museum and the Smithsonian Astrophysical Observatory more frequently. In FY 1986, OPS health personnel completed 5,265 screening examinations.

Medical standards for SI divers have been revised in strict accordance with the standards of the Undersea and Hyperbaric Medical Society, the National Oceanic and Atmospheric Administration, and the American Academy of Underwater Sciences. Meetings are conducted with divers to explain the new regulations. OPS reviews medical qualifications of those planning to dive, performs physical examinations of divers, represents SI on appropriate committees of national diving organizations especially with regard to scientific diving, and provides liaison on medical aspects of scientific diving with Federal agencies, legislative committees and scientific societies.

OPS is now conducting stringent inspections of all Smithsonian museums and National Zoological Park food service facilities and requires testing of all food handlers for tuberculosis. Additionally, OPS has expanded its counseling program for employees with alcohol, drug abuse, or emotional problems which effect employee work performance bringing it into full compliance with the requirements of Public Law 91-616. A member of the OPS staff who is a certified counselor is now available to employees on a full-time basis. The number of referrals is increasing dramatically as this service is publicized more widely to employees and supervisors and as extensive training programs are conducted for management personnel.

EXPLANATION OF PROGRAM INCREASE:

Quadrangle Staffing Requirements - (10 workyears and \$221,000) - For FY 1989, an increase of 10 workyears and \$221,000 is requested to provide additional security personnel for this area. In FY 1988, 67 guards will be available for security in the Quadrangle. This increase of 10 workyears is required as a result of the restructuring of the exhibit galleries and the garden in the Quadrangle. The original design of the Oriental exhibit galleries and the Southwest exhibit galleries, first level, required four posts. These galleries have all been redesigned and are divided into nine separate galleries, which also includes a mezzanine gallery. To provide adequate guard coverage for these galleries, seven posts are now required. The additional three posts will require five workyears.

The original design of the African Art exhibit galleries and the Southeast exhibit galleries, first level, required four posts. The restructuring of these galleries into several small exhibit areas has increased the needed posts to seven. The additional three posts will require five workyears.

The number of guards required to staff one post eight-hours-a-day, seven-days-a-week is 1.67 guards. This allows for breaks, lunch, leave, and training time over a one-year period. Therefore, six additional posts will require 10 workyears. The number of required posts is determined by many factors including crowd conditions, value of objects on display, the vulnerability of those objects to accidental damage, vandalism, or theft, and the effective field of vision of the assigned protection personnel. The redesign of these exhibit areas has reduced the field of vision to very small areas, and the vulnerability of the objects on display to vandalism or theft has been greatly increased.

In FY 1990, additional funding and 10 workyears will be requested for security personnel. The additional personnel will be needed to provide coverage for the Kiosk, one post on the third shift, three posts for the garden, and two supervisory posts.

General Post Office Building Staffing Requirements (20 workyears and \$510,000)

For FY 1989, an increase of 20 workyears and \$510,000 is requested to provide security coverage at the newly acquired General Post Office Building. The Office of Protection Services will be required to provide security coverage in a "caretaker" operation for the building seven days a week, 24 hours a day.

As a caretaker operation, one supervisory and three nonsupervisory guard posts will be required on each relief to maintain an adequate security posture. These positions will allow the building to be patrolled on each relief to guard against potential problems such as fire, theft, and vandalism. Outside patrols will be performed periodically to protect the building against vandalism. The security force will be incorporated with an existing security force to reduce the number and level of supervisors required. A perimeter security system will be installed from existing security equipment upgrade funds and connected to the Smithsonian Institution Proprietary Security System.

The requested increase includes \$75,000 for basic security supplies, laundry and dry cleaning, uniforms, lockers, and radio equipment. The one-time costs for lockers and radio equipment will be used in the following years for maintenance of uniforms, equipment, and alarm systems.

When the building is renovated and increased operations begin, additional security personnel will be required. The required number of workyears and level of funding are not known at this time. Access for the public, exhibit areas, storage areas, and numerous other factors will be the determining factors for the amount of increase to be requested.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - These are provided by an allotment and by reimbursements for the use of guard services at special events and lectures at Smithsonian facilities. These funds are used to purchase supplies, materials, and equipment.

OFFICE OF PLANT SERVICES

(Dollars in Thousands)

	APPLICATION OF FUNDS									
Fiscal Year	FEDERAL FUNDS		UNRESTRICTED FUNDS				RESTRICTED FUNDS		GOV'T GRANTS & CONTRACTS	
			General		Special					
	FTE*	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount	FTP**	Amount
FY 1987 Estimate	499	35,618	7	1,572	7	152	--	4	--	--
FY 1988 Estimate	493	37,104	6	989	8	131	--	--	--	--
FY 1989 Estimate	506	38,884	6	985	7	122	--	--	--	--

* FTE = Full-time equivalent

**FTP = Full-time permanent

ABSTRACT - The Office of Plant Services (OPlants) operates, maintains, and repairs 14 museums and art gallery buildings including the Quadrangle, which opened to the public in September 1987, and a number of other work and collections storage areas located in the Washington metropolitan area and New York City. OPlants provides utilities, transportation, and mail services as well as exhibits renovation and other essential program services in support of research, exhibition, education and other public programs. In addition, technical service and assistance are provided to other Smithsonian units located outside the Washington metropolitan area including the Tropical Research Institute in Panama, the Cooper-Hewitt Museum in New York, the Whipple Observatory in Arizona and the Environmental Research Center in Maryland. Also included in this line item are the Office of Horticulture, South Group Building Management, and the Quadrangle Facility Management units. The Office of Horticulture is responsible for the management of the Smithsonian Institution grounds and to provide horticultural assistance to Smithsonian bureaus. The operation of the greenhouse-nursery facility supports these horticultural needs of the Smithsonian. In addition, educational outreach is provided through lectures, seminars, and horticultural exhibitions. South Group Building Management is responsible for a full-range of maintenance services for the Arts and Industries and Smithsonian Institution Buildings. The Quadrangle Facility Management is responsible for a variety of maintenance support services for bureaus located in the Quadrangle building.

For FY 1989, an increase of 11 workyears and \$390,000 is requested to provide sufficient base funds for salaries, supplies, services and equipment in support of the Office of Plant Services facilities operations, maintenance and repair personnel.

A further sum of 2 workyears and \$60,000 is requested for the Office of Plant Services to allow for adequate staffing and provision of supplies, equipment and services to support the Smithsonian's acquisition of the Old General Post Office Building.

An amount of \$1,330,000 to support the Institution's utilities, postage and rent costs is being requested and justified in the Uncontrollable Increases section of this budget.

PROGRAM - I. Office of Plant Services - The Office operates, maintains and repairs the Smithsonian's physical plant on or near the Mall, including over 5.1 million net usable square feet in museums and art galleries. In addition, OPlantS operates, maintains and repairs 82,000 square feet of space in the Cooper-Hewitt Museum in New York City. The Office of Plant Service provides maintenance of building interiors and exteriors; mechanical and electrical equipment including elevators and escalators; lighting and refrigeration components; and oversight of emergency property repairs which are accomplished by service contracts. Trade and craft support includes plumbing, painting, woodcrafting, plastering, sheet metal and electrical work which are provided in support of OPlantS' efforts directed toward furthering research projects, office relocations and modifications, exhibition installations and public events in all facilities.

The Computerized Facility Monitoring System continues to analyze and control mechanical equipment and monitor environmental conditions in major Smithsonian buildings. This System monitors those areas of the buildings that require stable humidity and temperature conditions, and alerts a control center when deviations from normal conditions occur. This prompt alert to abnormalities allows immediate adjustments to be made, thereby avoiding costly repairs that would otherwise be necessary to maintain the proper environmental conditions within the buildings.

The Computerized Preventive Maintenance System which is used for scheduling preventive maintenance on operating systems in Smithsonian facilities continues to provide reliable and efficient information regarding physical plant operations. Preventive maintenance is scheduled for fire prevention systems, guard stations, automatic lighting, roofing systems and heating, ventilating and air conditioning mechanical equipment located in all museums and the Environmental Research Center near Edgewater, Maryland. Regular preventive maintenance on these systems assures longer life, increased reliability and decreased repair costs.

A supply warehouse at the Smithsonian Institution Service Center is maintained by the Office of Plant Services to stock and distribute frequently used supplies and materials. These materials are purchased in bulk, to obtain the most favorable prices, and stored at the Service Center for future distribution. OPlantS also offers packing, crating, warehousing and moving services for museum objects and collections, as well as support for office relocations and modifications. In addition, OPlantS is responsible for providing transportation services for the Institution, including maintenance, repair and operation of Smithsonian vehicles, as well as the processing of mail and the monitoring of postage costs.

In FY 1987, OPlantS provided essential program support services to museums and other Smithsonian organizations. These projects included: preparation of exhibition halls to accommodate modifications for new exhibition installations; renovation of office space to accommodate changing program needs; pilot project installation of a computer controlled exhibit lighting system; initiation of a building inspection program to assure prompt attention and repair to those areas in need; continued environmental analysis in major museums by the facility monitoring equipment to assure stable temperature and humidity controls; installation and maintenance of fire detection and suppression systems; and preparation of the Quadrangle for occupancy by staff and the public.

Significant accomplishments in FY 1987 included providing trade and craft support such as electrical, plumbing, woodcrafting, painting and machinist in support of more than 50 exhibit projects for Smithsonian organizations. Notable among these were: "Portraits of Nature" at the National Museum of Natural History; "Engines of Change" and "Field to Factory" at the National Museum of American History; "Russia, The Land, The People" at the Renwick Gallery of Art; "Recent Acquisitions" and "Nancy Graves" at the Hirshhorn Museum and Sculpture Garden; "Aviation Art" at the National Air and Space Museum; "Time Men of the Year" and "The Rosenquist Exhibit" at the American Art/Portrait Gallery; and the opening of the Enid A. Haupt Garden.

II. Office of Horticulture - The Office applies the discipline of horticulture as an educational, scientific, research, exhibition and display activity for the Smithsonian Institution. As such, significant collections of living plants and horticultural artifacts are under its management. The Office provides horticultural services to all Smithsonian bureaus and museums. These services include interior and exterior landscape management as well as design, installation, rotation, and maintenance; research and development of historically styled gardens for museum grounds; and special exhibitions. To assure the quantity and quality of plants needed to fulfill these programs, the Office of Horticulture operates a greenhouse-nursery complex. Responsibilities of the Office also include: pest control, snow and ice removal on and off the Mall, and policing of trash on the grounds.

Accomplishments in FY 1987 included the completion and opening on May 21, 1987, of the Enid A. Haupt Garden. Highlights of this unique rooftop garden are the 19th-century garden furniture, large specimen trees and distinctive water features. The interior plant program for the Quadrangle grand concourse and the two museum pavilions will be completed in conjunction with the opening in September, 1987.

Various Smithsonian museums have requested Office of Horticulture assistance during FY 1987 in providing specific plants for exhibits ("Robert Bateman," National Museum of Natural History; "Ebla to Damascus," National Museum of Natural History; and "New Mexico," National Museum of American Art). Also, the Office has produced specialized exhibits in the North foyer, Natural History Building, featuring grasses, orchids, poinsettias, African Violets, chrysanthemums and tropical plants. The 1987 Folklife Festival utilized vegetable plants and flowers grown by the Office of Horticulture.

Also during FY 1987, a major collection of 65,000 photographic slides and glass plate negatives of "Notable American Parks and Gardens" was donated to the Office of Horticulture by the Garden Club of America. A grant by the Smithsonian Society in FY 1986 of \$15,000 is being used to transfer these images to laser disc. The Office of Horticulture's photographic collection has become a premier resource tool for the study of contemporary and historic gardens, their furnishings, and horticulture in commerce, the decorative arts, and costume.

As part of its educational outreach activities, the Office participated in three regional flower shows in New York, Philadelphia, and Washington, D.C., which were seen by thousands of visitors. The Office received the following awards: (1) "Certificate of Merit," awarded to exhibits demonstrating exceptional educational, design, or horticultural qualities, New York Horticultural Society; (2) "Exhibit of Exceptional Merit," Pennsylvania Horticultural Society; (3) "Contributions to

an Exhibit of Exceptional Merit," Pennsylvania Horticultural Society, (For assistance to the Morris Arboretum, University of Pennsylvania exhibit); and (4) "Special Award" and a Revere Bowl, Sponsors of Washington, D.C. Flower Show.

III. South Group Building Management - The South Group Building Management is responsible for the cleaning, minor maintenance, labor services, relamping, craft services, shipping and receiving, special events, contract coordination for maintenance, trash removal, pest control and renovation projects for the Arts and Industries and the Smithsonian Institution Buildings.

IV. Quadrangle Facility Management - This Office provides a wide variety of support services to the Museum of African Art, Arthur M. Sackler Gallery, Resident Associate Program, National Associate Program, Smithsonian Institution Traveling Exhibition Service, and the Directorate of International Activities. These services include shipping and receiving, custodial, labor, rigging, minor maintenance, lamping and other services.

EXPLANATION OF PROGRAM INCREASE - For FY 1989, an increase of 13 workyears and \$450,000 is requested to provide the Office of Plant Services with the adequate base resources necessary to ensure that buildings maintenance efforts and programs in place are able to maintain pace with the increasingly complex demands that are being placed on an aging physical plant (11 workyears and \$390,000). These funds will also ensure caretaker operations and maintenance of the Old General Post Office Building (2 workyears and \$60,000).

Facilities Maintenance Program (11 Workyears and \$390,000) - For FY 1989, an increase of 11 workyears and \$340,000 is requested to provide additional maintenance mechanics necessary to alleviate the backlog of essential maintenance in Smithsonian buildings. The annual facilities inspections, begun in FY 1987, are identifying areas needing repair and essential maintenance that must be performed on aging facilities and systems in order to continue operating optimally and serving the Institution and the public. This increase will allow additional resources to be directed to the routine correction of inefficient or potentially dangerous situations which are being revealed and identified as a result of the inspection program. Funds are also being requested in the R&R program for major repair and restoration work required to eliminate the backlog of such deferred maintenance.

An additional sum of \$50,000 is required to purchase supplies (\$30,000) and equipment (\$20,000) that will be used by the additional OPlantS' staff in support of reducing the backlog of essential maintenance and making essential repairs to Smithsonian facilities.

General Post Office Building Acquisition (2 workyears and \$60,000) - For FY 1989, an increase of 2 workyears and \$60,000 is requested to provide two maintenance mechanics to be devoted to the operation and maintenance of mechanical equipment at the Old General Post Office Building as the Smithsonian assumes caretaker responsibility. The presence of these two full-time operating personnel in the facility will allow familiarization with capabilities of the operating systems and will offer the Institution a smooth transition to responsibility for this facility as well as an increased ability to address future operations concerns. Once the building has been renovated and is fully operational a full complement of operating and preventive maintenance mechanics will be requested.

NONAPPROPRIATED SOURCES OF FUNDING:

Unrestricted General and Special Purpose Funds - Unrestricted Trust funds are provided by allotments and are used primarily to cover salaries and support costs in the Office of Plant Services and to provide for the Trust fund share of space rental costs for administrative activities located in L'Enfant Plaza. Special Purpose funds are provided through reimbursements primarily from Trust-funded client organizations for support services rendered. These amounts are used to purchase supplies, services, equipment and landscaping materials.

MUSEUM PROGRAMS AND RELATED RESEARCH
(SPECIAL FOREIGN CURRENCY PROGRAM)

SMITHSONIAN INSTITUTION
MUSEUM PROGRAMS AND RELATED RESEARCH
(SPECIAL FOREIGN CURRENCY PROGRAM)

1987 Appropriation.....	-0-	—		
1988 Appropriation.....	-0-			-- Equivalent in Excess
1989 Estimate.....	-0-	—		Foreign Currencies

PROGRAM OF GRANTS FOR RESEARCH

The Smithsonian Institution, through its Special Foreign Currency Program, makes grants to United States universities, museums, and other institutions of higher learning, including the Smithsonian itself, primarily for research and advanced professional training in fields of traditional Smithsonian competence.

Funding for this program through FY 1986 had been provided directly by appropriations in excess currencies received from Congress. Outlays from the budget authority appropriated through FY 1986 will continue through at least FY 1989, with outlays from the Forward-Funded Reserve for the American Institute of Indian Studies continuing into the 1990s. In addition, beginning in FY 1986, the Smithsonian has received allocations of U.S.-owned Indian rupees from the funds appropriated to the Department of State in FY 1985 for the establishment of the U.S.-India Fund for Educational, Cultural and Scientific Cooperation.

For more than 20 years, the Smithsonian program has been a major source of support for research carried out by United States institutions in those countries for which excess foreign currencies are available. (OMB Bulletin 87-17, issued on June 30, 1987, indicates that Poland and Burma are designated as excess currency countries for FY 1988.) While the full responsibility for the design, execution and publication of research results rests with a scholar working within the program of a United States institution, Smithsonian foreign currency grants have also strengthened the research and training activities of collaborating institutions abroad, since most projects directly involve host country institutions and scholars. Enduring professional ties which result from joint efforts and scholarly exchange contribute to the strongest form of United States cultural relations with other nations. Also, these ties contribute to the integration of the worldwide advancement of science which serves to narrow the gap between the industrial and the developing nations.

The rapid growth of world population and technological development has resulted in significant effects on the natural environment and on society. Research in the natural sciences and in cultural history sponsored by the Smithsonian through this Program is aimed in part at improving understanding of the environment and the management and conservation of scarce natural and cultural resources.

In FY 1987, ongoing research supported by these grants included the following projects of special interest:

Archeological and geomorphic studies at Ghazi Shah in Sind, Pakistan, are providing information on river channel, climatic and tectonic changes as they affected pre-historic settlement in the Lower Indus valley.

An ongoing exchange between Indian and United States astronomers is elucidating questions on applications of nuclear, elementary and relativistic physics to astrophysics.

Studies on the vegetation in the Bharatpur wetland in India are providing indices for predicting the impact of changes in water regime on vegetation development.

An exchange between United States and Pakistani folklorists, anthropologists and linguists is introducing new research techniques in music, foodways, language and art.

Studies of local technologies used in restoring pagodas and temples at earthquake-damaged Pagan in Burma are providing new low-cost solutions to worldwide preservation problems.

Further, with emphasis on information exchange through small workshops, symposia and field conferences, the Smithsonian is encouraging international research in specialized areas. In FY 1987, for example, United States scholars received support for participation in exchanges on the subjects of public culture, environmental education, astronomy, sociology, numismatics, primates, world capitalism, ancient sea trade, and snow leopards.

FORWARD-FUNDED RESERVE FOR THE AMERICAN INSTITUTE OF INDIAN STUDIES

Since 1967, the Smithsonian has provided annual funding through the Special Foreign Currency Program to the American Institute of Indian Studies (AIIS) for fellowships, research, symposia and publications and for administrative costs. The Smithsonian has helped sustain this Institute and other American research centers abroad for the last 20 years because of their significant contributions to scholarship and science without regard for national boundaries and their special service to American scholars conducting research.

During FY 1980 through FY 1985, a forward-funded reserve of \$7,170,000 equivalent in rupees was established for the AIIS to prevent the sudden termination of its programs after the removal of India from the excess currency list (which occurred at the end of FY 1985) and to provide it with interim funding for a period of years after the end of excess currency status. Beginning in FY 1986, the AIIS, with oversight from the Smithsonian, has drawn upon the funds from this reserve for its fellowship program and administration costs in India. Annual proposals continue to be examined through the Smithsonian's peer review system before each yearly increment is released from the reserve account. It is anticipated that the reserve will support AIIS programs through the 1990s in conjunction with continued support from the U.S.-India Fund.

U.S. - INDIA FUND FOR EDUCATIONAL, CULTURAL, AND SCIENTIFIC COOPERATION

In FY 1985, \$110 million equivalent in U.S.-owned Indian rupees was appropriated to the Department of State to establish the U.S.-India Fund for Educational, Cultural, and Scientific Cooperation. Beginning in FY 1986, the Smithsonian has received allocations from this fund to continue programs in India similar to those administered under the Special Foreign Currency Program which would otherwise have been discontinued when India was removed from the excess currency list in 1985. An amount of \$1.4 million was received in FY 1986 and \$1.5 million in FY 1987.

FACILITIES PLANNING, RENOVATION,
RESTORATION, AND CONSTRUCTION

CONSTRUCTION

1987 Appropriation.....	\$6,095,000
1988 Estimate.....	\$4,470,000
1989 Estimate.....	\$7,200,000

The FY 1989 request for funding in the Construction account represents the Institution's long range goals to develop adequate facilities to support its far reaching programs in research, collections management, exhibitions, education and public service. A well planned and consistently funded capital improvement program is essential for the continued effectiveness of the Institution's many and varied activities, and it is no less important to provide a basis for program expansion to meet future challenges. For FY 1989 funding is sought to continue development of research facilities at the Tropical Research Institute, to begin design of the renovations required on the General Post Office Building to be transferred to the Smithsonian in FY 1988, and for identification and planning for future facility improvement requirements.

SMITHSONIAN TROPICAL RESEARCH INSTITUTE

Consistent with the objectives of the Smithsonian's research programs, the Institution has initiated a coordinated effort to improve science facilities to meet program needs. Congressional authorization has been received for planning and construction of improved housing and additional research facilities at various sites of the Smithsonian Tropical Research Institute (STRI) in Panama. For FY 1989 an amount of \$2,900,000 is requested to continue development of STRI facilities with construction of a laboratory and growing facilities on Barro Colorado Island.

The Smithsonian Tropical Research Institute, located in the Republic of Panama, is the principal United States center for research in tropical biology. Each year hundreds of national and international researchers join the permanent STRI staff in undertaking fundamental studies on the tropics. Increasingly, scientists and policy makers have recognized the need to understand how tropical ecosystems function, to predict more accurately environmental changes in temperate zones and guide development programs that affect tropical environments.

The Smithsonian has identified a need to replace and improve obsolete, substandard facilities now in use at the Smithsonian Tropical Research Institute, as well as to provide additional facilities to support the current research program. The Smithsonian plans a phased construction program, to be completed in the next several years, according to a master plan which was completed in March 1986. In FY 1987, an amount of \$2,780,000 was appropriated toward the construction of a terrestrial laboratory and conference center on the Tivoli site with the balance of \$4,000,000 coming from a gift. Resources sought in FY 1989 for construction of a laboratory and research facility on Barro Colorado Island will continue development at that site as outlined in the master plan.

The Barro Colorado Nature Monument encompasses 12,000 acres of tropical forest surrounding the central portion of the Panama Canal, where over 60 years of previous biological research provides foundation information for current research without parallel anywhere in the tropics. Under the Panama Canal treaties, STRI was assigned custodianship of this area on behalf of the United States and the Republic of Panama. Barro Colorado Island (BCI), at the center of the Nature Monument, is one of the most intensely studied tropical sites in the world, attracting scientists from all parts of the globe. In addition to the field

research sites immediately accessible by footpath from the existing development on BCI, the Island serves as the logistics base to field sites accessible by boat on the peninsulas surrounding the island. The Island is also the logistic and communication center of the game warden contingent that provides 24-hour patrol of the large Nature Monument area. The 3,707 acre Island site is located 30 miles from Panama City in Gatun Lake on the Atlantic side of the continental divide. The Island site is accessible only by boat from the mainland.

The research on BCI entails both field observational studies and, increasingly, the use of modern laboratory equipment and computers. The existing wood frame laboratory possesses few of the modern features necessary to support sophisticated research, and has become deteriorated and costly to maintain due to its susceptibility to the constant humidity and termite infestations. The amount of \$2,900,000 requested for FY 1989 would be used to design and construct replacement laboratory facilities on the Island. A detailed breakdown of estimated costs and a description of the facilities plan follows.

	<u>Estimate</u>
Construction	\$2,050,000
Escalation	350,000
Design and Construction Management	250,000
Equipment and Furnishings	<u>250,000</u>
Total Project Cost	\$2,900,000

The amount of \$2,050,000 is required to construct a new laboratory facility of approximately 12,200 square feet along the shoreline site of the Island, near the dining and staff accommodations now being built with funds from the Restoration and Renovation of Buildings account. The building will contain communal laboratory facilities for use by both resident and visiting scientists, including an entomology laboratory, instrument laboratory, chemical laboratory, balance room, computer room, darkroom, and cold storage room, as well as laboratories and offices for scientists. In conjunction with the new building, a vivarium, an insectary, and a growing house, a total of about 5,300 square feet of space, will be constructed at the existing cleared site up the hill from the shoreline. These facilities are essential to support studies of animal, insect and plant specimens. No adequate vivarium currently exists. The insectary is, at best, only a makeshift temporary structure sitting precariously atop an old water tank, and the existing growing house contains insufficient space to meet total needs of the plant biologists. An amount of \$350,000 will be required to cover anticipated escalation in project costs and \$250,000 will be needed for design and construction management of the project. In addition, an amount of \$250,000 is required to equip and furnish the laboratory and growing space.

GENERAL POST OFFICE BUILDING

Since 1958, when the Institution acquired the Patent Office Building, there has been interest in obtaining the General Post Office Building, which is immediately across F Street and further bounded by 7th, 8th and E Streets in northwest Washington, D.C. Both buildings are the work of America's first native-born professional architect, Robert Mills of South Carolina, who also designed the Washington Monument and the Treasury Building. Since the early 1960s, the Smithsonian has reiterated frequently its interest in the Building to the General Services Administration (GSA).

On October 19, 1984, the President signed P. L. 98-523 authorizing transfer of the General Post Office Building from the General Services Administration to the Smithsonian Institution without reimbursement. It is anticipated that the current occupant of the building, the International Trade Commission, will be relocated in the spring of 1988, and the building will then be transferred to the Smithsonian. The Institution has already completed a preliminary space use and conceptual plan for the building, which has been presented to several Congressional committees and the District of Columbia Council. The conceptual plan suggests a shared and mixed use of the General Post Office Building by the three occupants of the neighboring Patent Office Building: the National Museum of American Art, the National Portrait Gallery, and the Archives of American Art. The two buildings together would provide space for expanded public activities and collections storage requirements of the three bureaus and would alleviate the physical constraints that the Archives, in particular, is forced to accept in the Patent Office Building. The General Post Office Building offers space for a wide range of museum activities including increased space for exhibitions, collections study, classes, seminars, lectures, and an auditorium which could accommodate larger audiences for the already successful public programming produced by the National Museum of American Art and the National Portrait Gallery.

Presently, the General Post Office Building is in very poor condition. Exposed plumbing, in almost every space throughout the building, is wrapped with asbestos insulation. The drinking water system is unsafe for consumption and bottled water is being used. The electrical system is over subscribed, in poor condition and a potential fire hazard. The steam heating system is unreliable: heat exchanger tanks are corroded and leaking and pumps and other mechanical equipment are old and in poor condition. Summer cooling is mostly provided by window air conditioners in various states of repair. Library and Hearing rooms use very old central units that are in unreliable and poor condition. The building is not equipped with fire safety mechanisms including water sprinklers and smoke detectors. It is equipped with an old and unreliable pull station local alarm system. There are two small passenger elevators; one is automatic and has several safety deficiencies, and the other requires an operator. Both are very old and reported to be subject to frequent breakdown. The rain gutters and interior down spouts were not replaced as part of recent roof repairs and are subject to intermittent failure, causing leaks in the building. Window frames are dry rotted, and the poor condition of the exterior stone facade contributes to interior water problems. The interior courtyard, a paved parking area, may be structurally unsound. The overall assessment of the building is that it is not safe for continued occupancy in its present condition.

For FY 1989 the amount of \$3,000,000 is requested for planning and design of the renovations that will be required before the Smithsonian can make use of the building. Preserving the historic nature of the building and converting it for public purposes will require a comprehensive program that must meet special museum requirements for fire protection and constant temperature and relative humidity in order to preserve the collections while also providing for the safety and accommodation of visitors. Elements of such a program would include razing the courtyard building and glass roofing the entire courtyard area; restoring all of the original interior and exterior architectural finishes; replacing the windows with double glazing; modernizing all electrical and plumbing systems; providing new insulation, a vapor barrier, and a heating and air conditioning system with industrial controls; installing appropriate lighting with ultraviolet screening;

and installing smoke detection and sprinkler systems along with other security equipment. The total cost of the renovation program is now estimated to be in excess of \$40,000,000.

Failure to make the most urgent of these improvements would prevent the Smithsonian from making even basic use of the building. Basic repairs to the building, along with replacement of the heating, ventilating, air conditioning, electrical and plumbing systems and installation of fire protection and security systems, are the minimum requirements to provide conditions necessary for museum occupation. Modernization of the building to include energy conservation will allow more efficient and effective operation of the building, and changes to architectural finishes are required to return the building spaces to public use while restoring it to its early appearance. Overcrowded conditions at the Patent Office Building, which houses the National Museum of American Art, the National Portrait Gallery, and the Archives of American Art, make it imperative that the General Post Office Building be made habitable as quickly as possible. Concern over the continued preservation of this architecturally important building also argues for early renovation. Because of the length of time necessary to make renovations of the kind required, the building will not be ready for use until FY 1992 if design funding is made available in FY 1989 as requested, and construction funding is provided in FY 1990. Continued delay beyond the projected schedule will have an adverse impact on the public programs at the two museums and the Archives in the Patent Office Building and will require location of additional space to house the Archives of American Art collections now stored off-site under poor environmental and security conditions. In addition, further renovation delays will require increased resources to simply maintain the building in a "caretaker" status until restoration can be initiated.

CONSTRUCTION PLANNING

An essential part of an effective facilities development program is the ability to assess major requirements and make long-range plans in sufficient detail. These actions are required so that accurate estimates may be made of costs of construction and operation, and that all issues affecting the projects may be identified and addressed before Smithsonian management decisions are made and approval is sought from Congressional committees and applicable review commissions. The Institution's current construction planning process results in requests for full funding of major construction projects (estimated cost above \$1 million) largely without the benefit of this detailed level of planning. This situation has often resulted in very rough estimates of project requirements, including physical requirements such as space or configuration, construction or operational costs, and environmental or logistic considerations. Also, the lack of resources with which to identify and assess fully all potential physical plant requirements has occasionally resulted in a somewhat piecemeal approach to capital improvement planning, and certain urgent requirements have not been integrated into Institutional plans in a timely fashion.

The Smithsonian proposes to correct this situation with requests in FY 1989 and succeeding years to develop a comprehensive long-range capital improvement program and to provide more definitive planning of future year construction projects prior to budget and authorization requests. A recent rough estimate of currently identified facilities expansion or improvement requirements total in excess of \$700,000,000. Specific projects include completion of master plan development at the Tropical Research Institute in Panama, renovation of the General

Post Office Building, development of a proposed museum and storage complex at Dulles International Airport, construction of administrative and support facilities to replace leased buildings at 1111 North Capitol Street and L'Enfant Plaza, and expansions of the Cooper-Hewitt and Hirshhorn museums. In addition, the general issue of development of extensive off-Mall facilities for collections storage must be addressed in the near future in order to find solutions for already overcrowded conditions in nearly all Smithsonian museums. The amount of \$1,300,000 requested for FY 1989 will provide feasibility studies, planning and conceptual designs upon which to base precise scopes of work and cost estimates for construction, establish operating and logistical support requirements, and make required environmental impact assessments for the most urgent of the construction projects under consideration by the Smithsonian management.

CONSTRUCTION AND IMPROVEMENTS
NATIONAL ZOOLOGICAL PARK

1987.....	\$2,500,000
1988.....	\$5,150,000
1989.....	\$5,600,000

This appropriation is for use at the National Zoological Park for repairs, alterations and improvements to plant property and for the construction of additions to existing facilities and minor new facilities including exhibits; preparation of plans and specifications for construction; and to perform renovations, restorations and new construction for implementing the Master Plan approved by the Commission of Fine Arts and the National Capital Planning Commission in FY 1973. The Zoo's facilities include 163 acres in the Rock Creek Valley of Washington, D.C., and a 3,150-acre Conservation and Research Center located at Front Royal, Virginia. Construction and improvements are accomplished primarily by contract, except in instances when suitable contractors cannot be located or their estimates are above acceptable cost levels in relation to proposed work. In such cases, accomplishment of the work by other means, such as the purchase of supplies, materials and equipment and the use of permanent staff or temporary labor, is the most economical alternative. Occasionally it is necessary to fund other related expenses from this account, particularly those associated with the displacement of animals as a result of the construction program or major grounds maintenance in repair of storm damage.

Status of the Construction Program - The National Zoological Park was established in 1889 under the Board of Regents of the Smithsonian Institution, which was authorized to "administer and improve" the Zoo for "the advancement of science and instruction and recreation of the people" (20 U.S.C. 81). The Zoo administers two permanent facilities. Exhibition, research and educational functions have been centered since 1890 on 163 acres in the Rock Creek Valley of Washington, D.C. Complementary animal conservation, research and breeding functions have been conducted since 1975 on a 3,150-acre site near Front Royal, Virginia.

The National Zoo's Rock Creek facilities have been undergoing renovations and improvements since FY 1974 through implementation of the Master Plan. With the transfer of selected and critical animal breeding functions to Front Royal, the elimination of costly projects and the scaling down of others, the total Rock Creek Master Plan program has been reduced from an original plan of 41 major projects and an estimate of \$118,000,000 (1974 dollars) to less than 30 projects and a current estimate of \$98,631,000 (1987 dollars) through FY 1993.

The total \$44,530,000 appropriated through FY 1987 for the Master Plan has been spent on 27 new or rebuilt exhibits and support facilities. In November 1986, a revised Master Plan was developed that incorporated changes in exhibit concepts as they have evolved during the past decade. Implementation of the revised Master Plan will place the Park among the world's finest zoos.

* For FY 1989, an amount of \$5,600,000 is requested to support construction and improvement projects at two sites operated by the National Zoological Park. Explanation of the sums of \$4,850,000 sought for Rock Creek and \$750,000 sought for Front Royal follows:

Construction

Aquatic Habitats - Phase I (Amazonia Exhibit-Structure) \$3,200,000 - This exhibit, to be constructed as the first component of the aquatic habitats complex, will utilize major structural components of the existing polar bear exhibit. It will be a greenhouse-enclosed replica of a tropical river flowing through a forest. It is specifically planned to duplicate a portion of the Amazon river. It will contain plantings of trees and plants to define the forest experience and enclosures for tropical species of birds, mammals, reptiles, amphibians and invertebrates. The exhibit will have an underwater viewing area, forest level viewing path, and a tree top canopy viewing area.

With this funding, the Zoo will modify the existing structural core of the polar bear exhibit. The exhibit area measures approximately 185 feet in length and 90 feet in width at its center and encloses an area of about 13,000 square feet. In addition to the main exhibit area and underground viewing gallery, there will be two smaller exhibit areas (one at each end), and off-exhibit spaces with service and support areas around the outer perimeter. The second phase of the Amazonia Exhibit will provide for the actual interior exhibits and a related funding request will be submitted in FY 1990.

Renovation, Repairs, and Improvements

Rock Creek - \$1,650,000 - An amount of \$1,650,000 is requested to continue the program of renovation, repair and preventive maintenance of existing Zoo facilities. This funding is required to keep the heavily used Zoo in safe condition for the visiting public, for the upkeep and improvement of animal enclosures and staff facilities, and to maintain new buildings in good condition so that in the future the Zoo will not be faced with a large backlog of repairs. In Rock Creek there are over 60 facilities of varying age and 163 acres of land containing over 18 miles of heavily used paths and roadways. The pedestrian paths and vehicle roadways require regular maintenance in order to prevent future, more costly repairs. Funds also will be used to complete emergency repairs to mechanical, electrical, plumbing and other support systems, as well as animal exhibits areas.

Front Royal - \$750,000 - An amount of \$750,000 is sought to continue the program of renovation and repair at the Conservation and Research Center at Front Royal. The Center, which is closed to the general public, is used by the Zoo for breeding endangered wildlife species and for associated conservation and research efforts. The Center includes 89 facilities of various types, containing approximately 236,000 square feet of interior space, two and one-half miles of paved roads, 20 miles of jeep trails and over 30 miles of fences, all of which must be maintained. The funds will be used for preventive maintenance that will reduce potentially more costly future repairs at the 3,150-acre facility.

RESTORATION AND RENOVATION OF BUILDINGS

1987 Appropriation.....	\$12,975,000
1988 Estimate.....	\$14,254,000
1989 Estimate.....	\$40,000,000*

* There are 38 workyears associated with this requirement.

The Restoration and Renovation of Buildings (R & R) account is used to finance repairs, alterations and improvements to Smithsonian facilities. (The repairs and renovations at the National Zoological Park are presented separately in this budget submission.)

Smithsonian facilities are comprised of over 5 million square feet of building space located in 14 museum and gallery buildings (including the Quadrangle, which is opening in September 1987) in Washington, D.C. and New York City, housing research and collections management activities and a wide range of exhibitions in the fields of science, history, technology and art. In addition, the Institution operates and maintains preservation, storage, aircraft and spacecraft display facilities and the Museum Support Center at Suitland, Maryland; centers for biological research, conservation and education in Panama and on the Chesapeake Bay near Edgewater, Maryland; a center for astrophysics in Cambridge, Massachusetts; and the Whipple Observatory on Mt. Hopkins in Arizona. These facilities range in age from new to 130 years old, and many are listed as Historic Landmarks.

In recent years funding levels for maintenance, repair and preservation of the buildings have not kept pace with the need. There now exists a substantial backlog of essential maintenance and repair work required to assure continued operation of building equipment and systems, provide long-term preservation of the buildings, or bring the buildings into compliance with life safety and health codes and standards. This backlog is currently estimated at \$216 million throughout Smithsonian buildings, and the backlog has not yet been completely identified in all buildings and facilities.

The present condition of the buildings has been brought about by a number of factors, among them the aging process of building materials, the heavy use of the buildings by the public, the demands placed upon building equipment and systems to maintain 24 hour-a-day constant temperature and humidity requirements to protect the National Collections, and the enactment of new life safety and health codes and regulations. In addition, building systems reach a point where even effective preventive maintenance and repair programs cannot keep the machinery running. HVAC, electrical and plumbing systems must be completely overhauled periodically to replace deteriorated equipment, wires and pipes.

Major increases in funding are required to reduce this backlog and to maintain the buildings for continued use by future generations. Annual funding at a "current services" level in the Restoration and Renovation of Buildings program is not sufficient to accommodate the work required. Some of the work is, in fact, more urgent today because inadequate funding in the past prevented the timely repair or replacement of building systems and components.

In previous years, the Smithsonian has presented a list of proposed projects to be initiated with R&R funds. The fact that the Institution has identified a \$216 million backlog of deferred maintenance suggested a need to more explicitly distinguish between various categories of projects to allow more effective budget planning. Based upon a review of all proposed projects, it is evident that they can be categorized into three distinct groups: cyclical replacement of major equipment and building systems; otherwise routine necessary repairs; and renovations undertaken because of new or changing programmatic requirements. The FY 1989 budget request for R&R funds therefore acknowledges these distinctions through the establishment of three sub-accounts for each category.

The first sub-account within the R&R account, called Major Capital Renewal, includes funds for the cyclical replacement of major building systems and equipment and major renovation projects. The magnitude of work involved, the concomitant planning requirements and the expense of these projects are unique from regular and preventive maintenance projects or repairs undertaken when a piece of equipment fails, and merits a separate category within the R&R account. More than half of the presently identified backlog consists of these major replacement requirements for heating, ventilating and air conditioning (HVAC) and electrical systems at the Natural History, Arts & Industries, American Art and Portrait Gallery and Smithsonian Institution buildings.

The second R&R sub-account is called "Repairs, Restoration and Code Compliance." Funding requested through this sub-account will be dedicated to eliminating the remainder of the backlog of deferred maintenance projects. However, the type of work to be done through this sub-account encompasses six categories of otherwise routine maintenance and repair projects, such as: general repairs; facade, roof and terrace repairs; fire protection and suppression projects; access, safety, and security improvements; utility repairs and improvements; and advanced planning and inspection for such projects. The request is presented in aggregate amounts for each of the above six categories of work within this sub-account.

Although the R&R account is mainly intended to provide resources for repair and restoration of its facilities, the account is also a vital source of funding for building modifications required to provide appropriate space to sustain the ongoing programs of the Institution. Therefore, a third sub-account is being established within the R&R account, titled "Alterations and Modifications" for such projects. The Smithsonian carefully balances the need for programmatic modifications with the need to apply substantial resources to the elimination of the backlog of essential maintenance and repair work.

Finally, included in the FY 1989 request is additional funding representing the requirement for administrative support for the much expanded level of work associated with the phased elimination of the backlog of deferred maintenance. The composition of this year's budget request follows.

MAJOR CAPITAL RENEWAL	\$ 7,663,000
REPAIRS, RESTORATION AND CODE COMPLIANCE	
General Repairs and Improvements	\$ 3,805,000
Facade, Roof and Terrace Repairs	9,875,000
Access, Safety, Security Improvements	4,200,000
Fire Detection and Suppression	2,030,000
Utility Systems Repairs and Improvements	4,372,000
Advanced Planning and Inspection	905,000
Subtotal	\$25,187,000
ALTERATIONS AND MODIFICATIONS	\$ 5,185,000
ADMINISTRATIVE COSTS *	<u>\$ 1,965,000</u>
TOTAL	\$40,000,000

* There are 38 workyears associated with this requirement.

MAJOR CAPITAL RENEWAL

In the life of every building, replacement of building systems or components eventually becomes necessary. Despite the best of care, HVAC systems, for example, reach an age when no reasonable amount of repair can keep the machinery running. Electrical and plumbing systems must be overhauled periodically to replace deteriorated equipment, wires and pipes. A number of the Institution's historic buildings have already reached or are approaching the age where this cyclical renewal of building components and systems will be required. Initial requirements for the major capital renewal program are described further below. This new sub-account is being established to distinguish this new program of work from other projects. Not only are major renewals of buildings extremely costly, but the planning and scheduling of such work is also very intricate. Moreover, these projects will require a funding commitment spanning several years and cannot jeopardize the continuation of adequate funding for ongoing repair projects which are required to keep facilities in good operational condition and in compliance with life safety and health codes. Without extraordinary attention now to the unique renewal needs of older buildings, their operational integrity is threatened and there is a risk that equipment and systems failure may require the total or partial closing of significant portions of buildings dedicated to exhibitions, collections storage and research activities. The Institution intends to review major capital renewal projects with the appropriate committees of the Congress, according to the wishes expressed by the Appropriation Subcommittees in the FY 1987 budget report.

American History Building (\$2,100,000) - A 1982 study of the HVAC system of the American History Building recommended replacement of the deteriorated heating, ventilation, air conditioning and refrigeration equipment and controls in the now 24-year-old building to assure provision of required environmental conditions in an energy efficient manner. The study also recommended modifications to the building envelope to increase energy efficiency. An amount of \$2.8 million provided in FY 1985 and FY 1986 (supplemented with \$1.4 million reprogrammed from the HVAC project at the American Art and Portrait Gallery Building) is being used to complete window and roof replacement and facade repairs.

In 1986, a Master Implementation Plan for replacement of the HVAC and related systems was completed. This Plan also incorporated anticipated fire protection and asbestos removal work in such a way that portions of the building could be isolated and all work required in each segment accomplished at the same time. This scheduling of complex but interrelated projects will both result in less disruption to the Museum's activities and save money by allowing an award of a single contract for the entire project.

The first phase of this project is being initiated with funding received in FY 1987 (\$1.2 million), and includes all work required in the east quadrant of the building. Funding anticipated in FY 1988 (\$1.6 million) will be used for Phase II, covering the west central quadrant. The amount of \$2,100,000 requested for FY 1989 will be used for Phase III, the west quadrant, and will include replacement of HVAC equipment (\$1,117,000), installation of sprinkler and smoke detection systems and other fire protection improvements originally outlined in the Fire Protection Master Plan (\$502,000), and removal of asbestos present in mechanical rooms and other areas of the building (\$233,000). Design costs for this segment of work are also included (\$148,000) as is funding to allow relocation of staff and collections displaced by the work (\$100,000).

Natural History Building (\$4,363,000) - Over the past several years a number of separate studies were undertaken that addressed energy conservation, fire protection and suppression, communications, security upgrading, asbestos abatement, and other remedies to building deficiencies, especially in the HVAC system and electrical systems. Once the magnitude of the work required to keep the building in operational condition was realized, a Master Implementation Plan was initiated to plan and schedule the work to limit the major disruption of each areas within the building to one period of time and to take advantage of cost savings by grouping tasks together.

Although fire protection improvements have been underway for several years (guided by a Fire Protection Master Plan developed in 1979), and some asbestos removal or containment work has previously been planned, it is the replacement of the HVAC and major electrical equipment that makes this project of major significance, and drives the scheduling of the work. The majority of the HVAC equipment has been in operation in excess of 20 years and has deteriorated to such a degree that it must be replaced immediately to avoid massive system failure. The automatic temperature control system is obsolete and does not operate satisfactorily. Ninety percent of the electrical lighting and power panels in the building have been in service over 20 years and are at or near the end of their useful life, and the main high-voltage switch gear equipment, which serves all the transformers for the Natural History as well as the Freer Gallery, Arts and Industries and Smithsonian Institution Buildings, is approximately 40 years old. These and related electrical equipment components are impossible to repair due to the unavailability of spare parts and must be replaced.

A detailed plan and schedule for the replacement of building systems at the Natural History Building has been developed, with work to be phased over 14 years in order to avoid major disruption of programs or closing of the Museum. The plan includes replacement of the HVAC system with a new centralized system in new penthouses over the east and west wings, and modifications to the building envelope such as roof insulation, replacement of single-glazed windows with triple glazed windows, installation of air locks or vestibules at entrances and loading docks,

centralization of laboratories with new exhaust air systems, improvements to the automatic temperature control system, and connection to a central control and monitoring system. Fire protection work originally planned under the Master Plan will be incorporated, along with removal or encapsulation of asbestos insulation located in the attics and on equipment, duct work and piping throughout the building.

The total cost of the project is estimated to be in excess of \$100 million. The estimate also provides for early replacement of HVAC and electrical equipment which cannot be expected to last through the 14-year construction period. Funds appropriated in FY 1986 (\$235,000) were used to prepare the Master Implementation Plan and to evaluate the requirements for interim corrective measures to keep the facility operational during the implementation of the project. Amounts of \$100,000 received in FY 1987 and \$475,000 anticipated for FY 1988 will be used to begin preparation of design and specifications of the initial phase of the work. For FY 1989, a total of \$4,363,000 is requested to continue design of the initial phases of the major replacement project (\$1,260,000), to design and begin interim equipment replacement (\$3,019,000), and to begin planning the relocation of staff and collections affected by the first stages of construction (\$84,000).

Arts and Industries Building (\$725,000) - The Arts and Industries Building is one of the finest examples of Victorian architecture in the nation. Originally designed to house representative artifacts of the Philadelphia Centennial Exposition, the construction of the building was started in April 1879 and completed in March 1881. The underground utility tunnel located within the building is as old as the building itself. Inspection, maintenance, and alterations of these utility systems has been disruptive, difficult and costly because the trenches are small with minimum access, and much of the piping and electrical circuits within them cannot be reached at all. Some pipes within the trenches are reportedly covered with asbestos insulation. The utility tunnels must be renovated before the HVAC, electrical and other utility systems, now reaching the end of their useful life, can be replaced. Although specific plans for major utility replacement have not yet been developed, it is clear that the present system of tunnels can no longer accommodate change. An amount of \$100,000 is anticipated in FY 1988 to develop a plan and schedule for modification of the tunnel system. The sum of \$725,000 is requested in FY 1989 for design and specifications. Approximately \$9 million will be required for construction.

American Art and Portrait Gallery Building (\$475,000) - The HVAC system in the American Art and Portrait Gallery Building is now approximately 24 years old and in poor condition and will need to be replaced within the next several years to assure continued operation of the system. At the same time, some improvements will be made to the overall system and the building itself to create environmental conditions required to preserve the collections housed in the building. Particular problems with the existing system include lack of close control of humidity and inability to provide simultaneous heating and cooling required during the transitional seasons--spring and fall--to maintain appropriate temperature. In addition to the replacement of air handling equipment, systems and controls, it is anticipated that the phased plan will include replacement of all windows with double-glazed windows; waterproofing and water detection system for the fourth floor; at a total cost of over \$6 million. For FY 1989, the sum of \$475,000 is requested for preparation of design and specifications for the project (\$400,000), and to study the conditions of the windows (\$75,000).

REPAIRS, RESTORATION AND CODE COMPLIANCE

Funds requested in this sub-account are for routine repairs and maintenance to eliminate the remainder of the deferred maintenance backlog. Amounts are requested for general repairs; facade, roof and terrace repairs; access, safety and security improvements; fire protection and suppression projects; utility repairs and improvements; and advanced planning and inspection for such projects. In a change from previous budget presentations, funds are requested in the aggregate for each of these six categories rather than by individual project. This will allow the Institution greater flexibility to direct dollars to fund an additional requirement in these areas that could not have been anticipated during the budget or facilities planning cycles. Without this flexibility, it is difficult to respond to changing priorities for repair work, or to deal with situations in which the work required is more or less extensive (or expensive) than originally anticipated. The amounts requested in each category are based on specific projects currently identified as the highest priority.

General Repairs (\$3,805,000) - Funds requested in this category support a wide variety of projects that do not lend themselves to discrete categorizations, and provide resources for minor unscheduled, but essential, repairs that cannot be anticipated specifically. For FY 1989, an amount of \$3,805,000 is requested for such projects as waterproofing and installation of a leak detection system in a third floor storage space in the American Art and Portrait Gallery Building; renovations and repairs to the galleries of the Freer Gallery Building to correct electrical and lighting problems and to replace badly deteriorated plaster; installation of a parapet and wall ventilation system at the Hirshhorn Building to correct a moisture problem on gallery walls; repair of a water intrusion problem in a gallery of the Air and Space Building and correction of air circulation problems in the elevator lobbies and shafts in that Building; an entrance grate system at the American History Building to reduce the dirt, dust, salt and other matter tracked directly into the exhibition areas by pedestrians; repair and painting of the gallery windows at the Natural History Building; repair and waterproofing of the pedestrian tunnel between the Smithsonian and Arts and Industries Buildings; painting and repair of the exterior and construction of a handicapped access ramp at the newly acquired Building 28, installation of a rest room for the disabled in Building 22, and covered protection for large equipment at the Silver Hill Facility; repairs to sidewalks, parking lots, roads and docks at various locations; general repairs at off-Mall facilities; and emergency repairs required throughout the Smithsonian.

Facade, Roof and Terrace Repairs (\$9,875,000) - Maintaining the integrity of the exteriors of all Smithsonian buildings is critical to prevent major structural and interior damage and deterioration due to age, water intrusion and weathering and to ensure a safe environment for visitors, staff and collections. Energy conservation also demands weather tight exteriors. Work in this category includes a variety of major projects that must be accomplished periodically according to the life cycles of the materials used. For example, roof replacements are needed about every 20 years, facade joints must be recaulked and repointed about every ten years; and window frames and other exterior trim should be repainted every five years. Several Smithsonian buildings require large-scale renovation, and work is under way to assure that in the future adequate protection of the exteriors of these buildings can be provided through a preventive maintenance and repair program.

An amount of \$9,875,000 is requested for facade, roof and terrace repairs for FY 1989. Currently planned projects include roof inspection, repair or replacement at the Cooper-Hewitt Carnegie Mansion, the Natural History Building, Renwick Gallery Building, Hirshhorn Building, Smithsonian Institution Building, and various sites at the Tropical Research Institute and the Silver Hill storage facility. Urgent skylight repairs are needed at the Air and Space Building to correct deficiencies in the original design, and a permanent solution will be studied and implemented as well. Roof and facade repairs and window replacement are also planned at the Air and Space Building to correct numerous water intrusion problems. The window glass and gaskets in the courtyard of the Hirshhorn Building will also be replaced, as failure of the seal between the panes has caused streaking and etching of the glass and occasionally allowed the panes to come loose. At the Cooper-Hewitt Museum, a basement leak in the Mansion will be corrected and the south facade of the Miller House will be repointed. Projects to restore the stone facade and replace the windows at the Smithsonian Institution Building will continue. The surfaces of the plazas at the Air and Space and Hirshhorn buildings must be replaced, as deteriorated paving materials currently present safety hazards and are allowing water intrusion into building spaces below. A portion of the terrace at the American History Building must be replaced as well to correct a leakage problem in the exhibit galleries beneath the west side. Repair and painting of wooden and metal facades and building elements are also necessary at a variety of locations, including the Tropical Research Institute.

Access, Safety and Security Improvements (\$4,200,000) - The Institution continues to place emphasis on correcting facility conditions to improve the security of the National Collections, promote improved environmental conditions for the health and safety of visitors and staff, and provide better access for disabled persons to Smithsonian buildings.

For FY 1989, \$4,200,000 is sought for a number of important projects in these areas. Among the projects planned for correction of hazardous conditions are the continuation of the asbestos abatement program, including a comprehensive survey of asbestos in Smithsonian facilities and development of a long-range master plan for elimination or containment; construction of a hazardous waste disposal facility and correction of a fume hood exhaust problem at the Museum Support Center; construction of an addition to Building 10 at the Silver Hill facility to meet OSHA code requirements for chemical cleaning; construction of a petroleum storage facility at the Tropical Research Institute; and a study of air quality at the Cooper-Hewitt Museum, where airborne fiberglass particles from the lining of the HVAC ducts are cause for concern. Other safety related projects include the repair of courtyard paving, the replacement of the tile floor in the third floor Great Hall, and modifications to the southwest emergency exit at the American Art and Portrait Gallery Building; installation of railings and safety barriers at the South Entrance, and railings on interior stairways in the Natural History Building; and design of a system to provide independent power for emergency lighting and other vital systems in the event of major power outages. Projects to improve access for disabled persons are also planned to meet current code requirements: installation of an elevator and freight lift at the Anacostia Museum; replacement of the Miller House elevator and a study of other access requirements at the Cooper-Hewitt Museum; installation of an elevator for disabled access to the mezzanine level in the "Life at Sea" exhibit hall of the Natural History Building; and rest room modifications to meet disabled access requirements at the American History Building. A number of projects to improve security of the collections, staff and visitors are planned as well, including installation of an elevator monitor panel

at the Air and Space Building, a security gate at the entrance of the Environmental Research Center in Edgewater, Maryland; improvements to the security system at the Freer Gallery Building; and security lighting and parking lot barriers at several Mall buildings.

Fire Detection and Suppression (\$2,030,000) - One of the Institution's major priorities is to provide the highest level of fire protection and safety consistent with today's standards and technology. Fire protection master plans have been developed and are being implemented at the Natural History Building, American History Building, Air and Space Building, American Arts and Portrait Gallery Building, and the Smithsonian Institution Building. Work includes the installation of heat and smoke detection systems; sprinkler and chemical suppression systems; fire doors and walls; and the improvement of exit capability. For FY 1989, an amount of \$2,030,000 is requested to continue fire protection master plan work in these buildings and to make other fire protection improvements in the Cooper-Hewitt Museum buildings; the Freer Gallery Building; the Renwick Gallery Building; at the Oak Ridge, Massachusetts facility of the Smithsonian Astrophysical Observatory; at the Environmental Research Center; and at the Tropical Research Institute. Lightning protection will also be installed at a number of currently unprotected buildings.

Utility Repairs and Improvements (\$4,372,000) - Funds in this category will be used to maintain, repair and upgrade the heating, ventilating and air conditioning systems (HVAC) and plumbing, electrical and communications systems in the Institution's facilities. Ongoing renovations, repairs and replacements of deteriorated equipment components are essential for increasing energy efficiency and for providing stable temperature and humidity conditions necessary for the long-term preservation of the National Collections.

Energy conservation remains a high priority at the Smithsonian. The most significant energy savings will be realized by applying substantial resources toward upgrading HVAC systems, replacing obsolete equipment and improving the efficiency of environmental zones. HVAC systems have been modified over the years as the Institution's programs have grown, as the functions of the buildings have changed, and as the environmental needs of the collections have become better understood. An integrated approach to renovations and modifications has now evolved to plan for long-range, systematic HVAC improvements that will meet museum environmental requirements in an energy efficient manner.

Comprehensive HVAC studies and energy audits have been conducted for most of the buildings to assist in planning future improvements. The scope of the HVAC studies included field investigations of age, condition and performance of existing equipment, controls and current operating conditions; reviews of existing drawings, specifications, operating manuals and hygrothermograph records; an analysis of the relationship between the building structures and the HVAC systems; and an assessment of programmatic needs for environmental control. The data gathered by these studies are providing a basis for determining redesign or replacement needs of existing HVAC systems; for development of construction cost estimates; and establishment of priorities for the repair, replacement or modification of such equipment components as air handling units, chillers, condensers, compressors, cooling towers, automatic temperature and humidity controls, pumps, pipes, fans, filters, duct work and related electrical and plumbing systems. At the same time, energy audits are being performed to investigate all factors relating to energy

use, such as power-consuming equipment and building conditions (doors, windows, insulation, floors and partitions). After evaluation of costs and potential energy savings and identification of energy conservation opportunities, plans are developed to carry out renovations and improvements. This process has identified a number of major system replacements which will be carried out under the Major Capital Renewal sub-account.

Routine repair, replacement and modification projects will be undertaken using funding of \$4,372,000 requested in FY 1989. Miscellaneous HVAC repairs and modifications are planned for the Air and Space Building, Smithsonian Institution Building, Hirshhorn Building, and the Anacostia Museum. Other repairs include replacement of the steam station equipment and storm drainage system serving the American Arts and Portrait Gallery Building and testing and balancing air and water systems in that building; modification of the steam heating system at the Freer Gallery Building; electrical switchgear replacement at the American History Building; and renovations of a rest room in the Arts & Industries Building. A number of other utility improvement projects are also planned, such as implementation of energy conservation measures and installation of an emergency generator and power surge protection equipment at the Cooper-Hewitt Museum; study and correction of basement ventilation problems at the American History Building; implementation of energy study recommendations at the Renwick Gallery Building; installation of an emergency generator at the Naos site of the Tropical Research Institute; a utility systems study and energy audit of the Smithsonian Institution Building; and replacement of outdated energy and facilities monitoring equipment throughout the Institution's buildings. In addition, installation of the Mall master raceway system will continue, and the project to replace all PCB filled transformers in Smithsonian facilities will be completed.

Advanced Planning and Inspection (\$905,000) - Funds provided in this category will be used for inspection and preliminary planning required in order to develop a long-range facilities repair and renovation program, and to accomplish advanced design of future year projects. A vital component of a comprehensive facilities management program is the ability to plan ahead. Through an active inspection program and a continuing master planning process, the Institution is coming to terms with its present and future repair and restoration requirements. With the amount of \$905,000 requested for FY 1989, the Institution plans to complete an integrated master plan for all facilities, complete a structural analysis of the Smithsonian Institution Building and an evaluation of the Ancon Building at the Tropical Research Institute, and begin development of space use and utility plan for the Arts and Industries and Smithsonian Institution Buildings. In addition, the Smithsonian will continue to use funding provided to complete the design of smaller, single year projects before receipt of construction appropriations, in order to develop accurate cost estimates and to take advantage of significant cost savings in escalation.

ALTERATIONS AND MODIFICATIONS

Projects in this category support development of the Smithsonian's outlying facilities and other projects required to meet programmatic objectives in the areas of research, collections management and exhibitions. For FY 1989, a total of \$5,185,000 is requested for the projects described below.

American History Building (\$700,000) - For FY 1989, funds are requested for two projects in the American History Building: the continuation of the project to install mezzanines in exhibit halls and renovation of the conservation laboratory.

The long-range exhibit reorganization plan for the National Museum of American History calls for construction of a mezzanine system in various galleries on the first through third floors of the building. The mezzanines will create space for study galleries in key exhibits, which will permit greater individual interaction by the public with museum artifacts not normally on exhibit because of lack of space. An amount of \$103,000 received in FY 1987 is being used to begin design, fabrication and construction of the basic steel and concrete galleries, necessary stairs, handicapped lifts and railings which will be incorporated into specific exhibit areas currently being designed by the Museum. The first exhibit to include the gallery concept is the exhibit planned to celebrate the Bicentennial of the Constitution, to open in the fall of 1987 on the east side of the third floor. The sum of \$300,000 anticipated in FY 1988 will be used for installation of mezzanines to be incorporated into the north sector of the Dibner Library and the southwest sector of the Medical Sciences Hall on the first floor. The amount of \$400,000 is requested for FY 1989 to complete the Research Center in the present Dibner Library.

The sum of \$300,000 is requested in FY 1989 for renovation of the conservation laboratory. Currently located in two separate locations in the basement of the building, much of the space was not constructed to serve as a laboratory. In addition to reorganizing the space to increase efficiency, utility improvements will be made, such as installation of fume hoods and upgrading the water supply and electrical service.

Natural History Building (\$565,000) - A total of \$565,000 is requested in FY 1989 for various projects in the Natural History Building, construction of a mezzanine for rooms 10-C and 11-E, installation of rest rooms at the West Loading Dock, modifications to office space, and demolition of Hall 10. These projects are required to consolidate functions in nearby areas and to increase efficiency of current operations of the Museum.

An amount of \$230,000 is also requested to renovate the space vacated by the ADP Center to provide additional space for adjacent staff offices, and to provide much needed conference space, rest rooms and kitchen facilities.

The microprep laboratory of the Department of Mineralogy is currently located in a different part of the building, and a mezzanine in Room 11-E is planned to place this laboratory in expanded space next to the Meteorite Saw. In addition, the Museum plans to construct a mezzanine in Room 10-C for expansion of space available for the Building Management Department staff and supply storage. An amount of \$165,000 is requested for FY 1989 for the construction of these mezzanines.

The sum of \$120,000 is requested in FY 1989 for construction of new rest room facilities near the West Loading Dock of the Natural History Building. Staff working in the West Basement and Court areas of the building, and contractors using the Loading Dock currently do not have adequate access to such facilities.

An amount of \$50,000 is also requested for demolition of Hall 10, used for Special Exhibits. The current exhibit, entitled "Evolution" will be replaced by an

exhibit commemorating the 500th anniversary of the discovery of America by Christopher Columbus. The space must be ready by early 1990.

Arts and Industries Building (\$600,000) - In recent years, relocation of staff prompted by the exterior work on the A&I building and the move of some staff to the new Quadrangle building, the Smithsonian has had an opportunity to begin planning consolidation of various central administrative functions to permanent locations within the A&I building. The exterior renovation will be complete in FY 1988, and funding is required to renovate spaces to accommodate relocation of functions in permanent spaces to permit greater efficiency of administrative activities. An amount of \$600,000 is requested in FY 1989 to renovate approximately 10,000 square feet of office space.

American Art and Portrait Gallery Building (\$50,000) - An amount of \$50,000 is requested in FY 1989 to improve the lighting to highlight the South Portico of the Building. The "F" Street entrance is used for evening events and the lighting needs to be improved for both safety and esthetic purposes. The Pennsylvania Avenue Development Corporation is involved in a study to determine the best approach to lighting the South Portico.

Air and Space Building (\$680,000) - The sum of \$680,000 is sought in FY 1989 for several projects at the Air and Space Building, including upgrading of the electrical service for special events, renovation of the space currently occupied by the cafeteria, and construction of a new guard station in the basement and conversion of the existing space into a conference area.

An amount of \$60,000 is requested for enhancements to the electrical service to several galleries often used for special events of the Museum. An engineering study will be conducted to determine the feasibility of adding 42 circuit panel boards in three wire closets serving the west end of the first floor, and the east and west ends of the second floor, to be used by caterers for food preparation equipment during events. The existing panels cannot accommodate the required loads.

Like many other Smithsonian organizations, the programs of the National Air and Space Museum have expanded in the past ten years. In late 1988 a new cafeteria complex will open on the East Terrace of the building, and the Museum proposes to use the third floor space currently occupied by the cafeteria to expand staff offices. A study is currently under way to determine the most effective use of the available space, approximately 12,000 square feet. An amount of \$520,000 is requested for FY 1989 for design and renovation of the space to accommodate the new functions. In addition, the sum of \$100,000 is requested in FY 1989 to relocate the present guard station in the Museum basement, and to convert that space into a conference room.

Silver Hill Facility (\$300,000) - An amount of \$300,000 is sought for projects at the Silver Hill storage facility in Suitland, Maryland, to increase the efficiency of existing buildings and to increase storage space. These projects include construction of a collection storage building and modification of an existing storage building used by the National Museum of American History, and to plan another storage building for the National Air and Space Museum.

The National Museum of American History does not currently have adequate space for the storage of reusable exhibit materials, such as cases, platforms, etc. An

amount of \$200,000 is requested for construction of a 3,000 square foot pre-engineered building, to be equipped with electricity, fire protection systems and heat. An additional amount of \$50,000 is requested for construction of a loading facility in the vicinity of Building 16, used by the Museum to store collections items. This facility will include a mechanical lift and canopy to make it easier to move objects in and out of the building.

Each year many exhibitions are installed throughout the Smithsonian Institution. The new exhibitions are often very different in nature from the exhibits they replace, and various exhibit props must be stored until they are needed again. At the National Air and Space Museum these props are often very large and difficult to store, and no adequate space currently exists to accommodate everything under conditions that would retard deterioration. For FY 1989 the sum of \$50,000 is requested for planning and design of a pre-engineered metal building at the Silver Hill facility for exhibit storage. Construction funds will be requested in a future year.

Environmental Research Center (\$175,000) - The sum of \$175,000 is also sought for construction of a pre-engineered metal storage building at the Environmental Research Center in Edgewater, Maryland. This building will be used for general storage of materials that are used for daily operations and research purposes which are not sensitive to relative humidity conditions.

Tropical Research Institute (\$580,000) - Funding in FY 1989 is requested for several projects at the Smithsonian Tropical Research Institute in Panama, including demolition work and boathouse renovation at Barro Colorado Island, seawater system improvements at Naos, and construction of a dock at Gamboa.

With funding provided in FY 1987 and FY 1988, new facilities at Barro Colorado Island are being constructed in a location more accessible to the waterfront. A number of these new buildings are replacing deteriorating and obsolete facilities, which must now be removed. For FY 1989, \$65,000 is requested for the demolition of the generator shed, kitchen and dining facilities, Workers House, Barbour House, Paper House, Elevated Water Tank, Animal House, Kodak House, the Laboratory and the Insectary. In addition, the sum of \$165,000 is requested to renovate the existing boathouse on the Island, to serve as a docking and boat storage area for the many small boats used by scientists and game wardens. The boathouse is now badly deteriorated and must be repaired to eliminate a number of unsafe conditions.

The sum of \$50,000 is requested for improvements to the seawater filter system, used for research at the Naos site. The current system cannot deliver sufficient volume within reasonable time periods to meet the needs of scientists. Modifications to the system will include larger pumps and additional filters for the existing system.

Gamboa is located on the Panama Canal about 15 miles northwest of Panama City. During the past year, this important research station has used docking facilities owned by the Panama Canal Dredging Commission to transport personnel and supplies to Barro Colorado Island. The docking arrangement is only temporary and the Commission has requested that the Tropical Research Institute provide its own facilities as soon as possible. As Gamboa is now the only "jumping off" point to Barro Colorado, it is critical that docking facilities be constructed to maintain regular and dependable transportation to the Island. The proposed dock will be a secure shoreline facility where large and small boats can be berthed and fueled,

and cars can be securely parked while staff is on the Island. An amount of \$300,000 is requested in FY 1989 for construction of the docking facility.

Smithsonian Astrophysical Observatory (\$320,000) - Funding is requested for two projects at the Fred L. Whipple Observatory in Arizona, including a communications system for the new Base Camp, and construction of a shelter for snow removal equipment on Mt. Hopkins.

A new Base Camp will be constructed with funds anticipated in FY 1988 (Construction account). In order to provide voice and data communications at the new Base Camp located in a remote area of Arizona, \$120,000 is requested in FY 1989. The communications system was not included in the scope of work of the Base Camp, as it was previously funded under the R&R program, but the final phase was deferred in FY 1987 to accelerate the PCB removal program.

Major scientific instruments and support facilities are located on a half-mile-long ridge of Mt. Hopkins, at an elevation of approximately 7,600 feet. In an average year, snow covers this area and the access road to it from November through April. Snow removal equipment must be kept on the mountain to plow snow and for winter road maintenance, and the plows are currently left unsheltered where they are subject to water exposure and freezing. Routine maintenance of these vehicles must often be done in the open. The sum of \$200,000 is requested in FY 1989 for a 2,000 square foot garage to house the snow plows and to serve as vehicle maintenance space as well.

Child Care Center (\$300,000) - Early in 1980 a survey and study was completed to assess the need for a child care center at the Smithsonian. Similar programs in other Federal agencies have proven to be a success, and the Smithsonian believes that such a self-supporting center would provide a number of benefits to employees. A general scope of work has been developed and it is anticipated that several centers might be needed to serve the employees in various locations. The sum of \$300,000 is requested for FY 1989 for design and construction of a facility.

Smithsonian Archives (\$175,000) - The Smithsonian Institution Archives is presently experiencing a storage problem. With an annual growth of approximately 800 cubic feet, the Archives is rapidly running out of space. The Archives proposes to modify a building presently available at the Center for Conservation and Research at Front Royal to serve as a storage area for seldom used materials. An amount of \$175,000 is requested in FY 1989 for installation of an environmental room, or "Bally" box in the interior of the building. Construction of this space will free much needed room on the Mall to accommodate growth for frequently used materials.

Photographic Services (\$275,000) - Funds are sought in FY 1989 for two projects to expand space available to the Office of Photographic Services. The sum of \$200,000 is requested for expansion of the refrigerated storage room that houses the collection of photographic negatives maintained by the Office of Photographic Services in the American History building. This collection represents a valuable resource of the Institution, and to insure long life, it must be kept under controlled temperature and humidity conditions. The present film vault, located in the basement of the building, is no longer large enough to accommodate the growing collection of negatives. Expansion is proposed into the corridor adjoining the present vault using a prefabricated "Bally" type structure.

The Photo Lab at the Natural History building was constructed in late 1964. In the intervening years the mission and volume of work has changed and grown. Improvements are needed to the lab to make the space more efficient, and to provide a new light trap door for the dark room. The sum of \$75,000 is requested to make the necessary modifications.

Smithsonian Institution Libraries (\$465,000) - Three projects are proposed to increase the efficiency of the Smithsonian Institution Libraries, a resource vital to the research programs of the Institution. The projects include construction of a Rare Book Library in the Natural History Building, modifications of a building at the Environmental Research Center for a branch library, and provision of compact shelving to relieve overcrowded conditions.

The present rare book storage area in the Arts and Industries Building is completely filled and awkward to service. A new Rare Book Library is proposed at the Natural History Building, and an amount of \$165,000 is requested in FY 1989 to complete construction of the new facility. The new area will include secure stack space with adequate shelving for large volumes, map and odd-size materials, reading and staff work areas, and an exhibit and special event area. This new facility will provide protection for rare books valued at several million dollars, while making them more accessible to scholars.

The Libraries also proposes to renovate the second floor of the Calf Barn building at the Environmental Research Center to provide a library for the Center. The sum of \$150,000 is requested for FY 1989 for the rehabilitation of the second floor of the building into appropriate library space with controlled environmental conditions, fire protection systems and electrical and utility services.

The amount of \$150,000 is requested in FY 1989 for compact shelving to alleviate overcrowded conditions in several locations. Use of compact storage saves up to 50 percent of space for book storage, and provides secure, lockable storage that can be sealed off from dust and light as well as prolong the life of the materials.

ADMINISTRATIVE COSTS

The amount of 38 workyears and \$1,965,000 is requested for 38 permanent positions required to support the management of the increased Restoration and Renovation of Buildings program. In FY 1979, the Restoration and Renovation of Buildings account for the Smithsonian Institution totaled \$2.1 million. This account has grown in annual funding to almost \$15 million in the FY 1988 request. The FY 1989 request represents another major increment of growth--to over \$38 million in funding required for Major Capital Renewal; Repairs, Restoration and Code Compliance; and Alterations and Modifications. Additional staff will be required in the offices with major responsibilities associated with management of the R&R program, if these much needed resources are to be fully utilized. The requested increases, enumerated below, represent an overhead rate of only 8 1/2 percent of the \$26 million increase in the R&R program from the FY 1988 level. Considering the large number of individual projects that makes up the Smithsonian's R&R program and the inherent complexity of construction in museum buildings where environmental conditions must be maintained 24 hours-a-day and construction must be scheduled around on-going public activities, this rate compares favorably with overhead costs expended by such organizations as the General Services Administration and the United States Army Corps of Engineers.

The Office of Design and Construction (ODC) bears the major responsibility for management of the R&R program. In addition to identification and planning of projects, ODC prepares or supervises development of detailed scopes of work, drawings and specifications required to bid the projects, and supervises, inspects, coordinates all R&R projects. With an increase to the R&R program of more than \$26 million in FY 1989, the staff of ODC, which has seen little increase since the R&R program totaled \$5 million in FY 1980, will need to be expanded to be able to plan and execute the program effectively. For FY 1989 an amount of 20 workyears and \$1,133,000 will be used for 20 positions in ODC, including five professional planners to identify and enunciate future facility requirements and develop budgetary needs; six architects and professional engineers to develop or oversee development of project plans and specifications for contracted construction services; a senior level construction engineer to provide full-time on-site construction management; a construction cost estimator to develop detailed government estimates of construction projects; two technicians to support the professional planning and design functions; a computer systems analyst to develop programs and computerized applications for facilities data storage, retrieval and analyses; and four clerical positions for typing and administrative support for all functional areas. Additional office space will be provided, and funding will be used for other support costs such as travel, supplies and materials and training of the added staff. Staff expertise will be heavily supplemented with contractual architectural and engineering services, particularly in highly specialized disciplines not required on a full-time basis and when workload exceeds in-house design capacity.

The Office of Procurement and Property Management also has extensive responsibilities related to the R&R program. At various stages in the life of most projects, contracts must be bid, negotiated, awarded and administered. The number of contracts is a more accurate determining factor in developing estimates for staffing requirements to support the R&R program than the amount of funding available. Although there are a number of very large projects included in the expanded R&R program proposed for FY 1989, the majority of the requested funding will be used for the same kind of small to moderate sized projects as those that make up the present program. The number of projects and, therefore, the number of contracts required, in the FY 1989 request, is almost double the number anticipated in FY 1988. An amount of \$555,000 and 11 workyears is, therefore, requested for 11 positions in the Office of Procurement and Property Management to support the R&R program. These positions include two senior architectural and engineering contract negotiation and administration specialists, four senior construction contract negotiation and administration specialists, two contract generalists, a computer systems specialist to assist in the development of necessary support systems, and three clerical positions for typing and record keeping support. Funding will also be used to provide appropriate office space for the additional staff.

In addition, staff resources are required in several other administrative offices to assure the essential level of support for the R&R program. For the Office of Environmental Management and Safety, 4 workyears and \$169,000 are requested for four positions to review project designs and specifications to assure all applicable life safety and health codes are met and to assure code compliance on construction sites. The sum of \$46,000 and 1 workyear is sought for the Office of Audits and Investigations for an auditor to assist in the required review of all contracts over \$100,000 before award. An accounting technician and \$20,000 and 1 workyear is requested for the Office of Accounting and Financial Services to assist

in the processing of the expected volume of requisitions related to the R&R projects, and a personnel specialist and \$42,000 and 1 workyear is required for the Office of Personnel Administration to provide personnel services for all the staff proposed for the R&R program.

SMITHSONIAN INSTITUTION LIBRARIES



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